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THE AMERICAN
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VOL. 97. SEPTEMBER, 1925. No. 9.

EDITORIAL

THE ART OF THE ANCIENTS.

A student was asked the meaning of the word empiric. He answered that it was "something done right, but in a wrong way." His teacher judged that the answer interpreted according to the definition, was a very "empiric" answer. But teachers know that it is quite common for pupils to give such "empiric" answers. They often unwittingly arrange their words so that they reflect wisdom.

However, "doing something right in a wrong way," has been a long-established habit with the human race. Nor is it a habit confined to any particular branch of human endeavor, although we doubt that it exhibits itself anywhere as persistently as in the fields of pharmacy and medicine.

Long before recorded medical history men dabbled with remedial agents and often quite blindly stumbled upon real discoveries. The cave man hated pain as much as we do and searched about for means to quell it. Like us, also, he looked in the realms of spirit and of matter, for his blessed antidote. And through the oft repeating cycles of human progress the quest for pain abatement has never ceased. It is still and always will be a most honored and honorable pursuit.

But the methods of inquiry and search have changed a great deal.

The cave man cured his headache with a draught prepared from a tuberous root that looked somewhat like a swollen human head. Ailing blood vessels he thought would be benefited by the scarlet juice of sanguinaria. Thus he anticipated, with his doctrine of signatures, Hahnemann's concept of "like cures like." And with his weird incantations and rituals and medicine man ceremonies our ancient ancestor long preceded the "readings" and "writings" of the founder of Christian Science. Animal drugs were very commonly used long before modern medicine gulped whole the endocrine fad.

But the trouble with the ancients, as regarded by modern scientists, was that they never knew, nor cared to know, why or how they

achieved results. The whole fabric of their remedial practices was based upon empiricism. Sometimes they did secure good results, but only accidentally. For them, one might thus paraphrase Tennyson's lines,

"Theirs not to reason why,
Theirs but to try and try."

But nowadays our concept is not to do anything unless we know the reason why. Science, the surgeon wants to be assured of the diagnosis and of the success of the operation, even though the patient may not survive.

Results are often ridiculed, when the methods cannot be fathomed.

Yet day after day the scientific literature records some justification of the empiric practices of those who have gone before us, who got their results, yet not knowing why or how.

"The world is waiting for the sunshine"—is the title of a popular song and not an advertising slogan for vendors of vitamine tablets, although it might well be so. But the ancients waited not, for they knew better than us the value of sunshine. They instinctively knew that it was the source of all activity. They wore their clothes so scantily that the sun had a chance to get in its protective, antiseptic, vital work. Then consider the food upon which they subsisted. Their bread flour was not as is ours, robbed of its real essence by overbleaching and over-chemicalization. It came to them as it should, vigorous in its vitamine content. So did their vegetables and fruit, plucked freshly and eaten uncooked—and their pure water from hillside springs—and milk and meats, rich in those life-giving substances, which modern dietary practice seemingly fails to conserve.

So we say that, despite their many errors, despite their "empiric" practices, the ancients did better in many ways than we, who are so prone to ridicule them.

Let us, if it pleases, console ourselves that we are vastly improved over our humble ancestors—in our insight into the sciences—in our wealth of specific medications and in our comforts. But let us not forget that they were in many respects closer to the truth than we are—for they relied on their primitive instincts to give them sound and fundamental answers to their fundamental questions.

In the books of yesterday is written much that we might read with profit. The art of the ancients was in knowing how, not why.

IVOR GRIFFITH.

DRUG-ADDICTION AND CRIME.

The control of the use of narcotic drugs has for some time been an international problem. It has been manifested mainly in the attempts to limit the production of opium to the necessities of medical treatment so that no appreciable excess will be available for other uses. So far as can be judged at present the effort has not met with success, seemingly on account of the interests that British capitalists have in the opium fields of India. An indirect way of attacking the problem has been to secure a satisfactory method of producing morphine synthetically, as this might do away almost entirely with the necessity of cultivating the poppy. Whether such procedure could be so thoroughly controlled as to allow of no illicit traffic may be doubtful, but if the cost of the product was less than that of the natural one, simple economic influences would destroy the India cultivation. Such results happened in the cases of the synthetic production of alizarin and indigo blue. The madder cultivation of France was wrecked by the former discovery and the indigo cultivation in India by the latter. Morphine is, however, not the only resource of the drug-addict, cocaine and heroin claim a large list of victims. This condition has been partly met by legislation to prevent the manufactures of heroin, the great majority of physicians having been convinced of its uselessness in therapeutics. Yet it is usually impossible to secure unanimity in such matters, and some time ago the *Journal of the American Medical Association* published a letter from one of its subscribers protesting strongly against the attempt to eliminate heroin from the materia medica, asserting that he had found it of great value.

Present interest in the subject of regulation of drug-addiction arises from the fact that arrangements are being made for an international conference at Philadelphia, presumably in the Sesqui-Centennial period, under the auspices of the International Narcotic Education Association. Congress is to be asked to appropriate a fund for enabling those interested to invite representatives from other nations, in pursuance of a resolution, adopted at Geneva, committing the nations to a policy of education in this matter. The present president of the international association is Captain Hobson. Data concerning the extent and effects of the use of these drugs are contained in a letter from Walter E. Lineberger, member of Congress from the Ninth California District. It is stated that in 1919, the

Treasury Department reported the number of addicts in the United States as over a million, and increasing, and that in the penal institutions of New York, over 60 per cent. of the inmates acknowledge the use of drugs. In 1924 an Assistant Attorney General reported that 40 per cent. of the persons tried in the Federal Courts were so addicted.

While it is always advisable to be cautious as to mass statistics, it seems evident that drug-addiction is a serious menace and should be dealt with severely. It is very doubtful whether one of the methods which the Federal Government has adopted, namely, the tax on each physician who wishes to employ such drugs is either wise or just. A nominal registry tax would not be a burden, and if strict inquiry was made as to the responsibility of the person to whom the certificate was granted better control might be obtained. The whole question is a difficult one, partaking as it does of the same character as the prohibition legislation, essentially a direct interference of government with the individual's self assertion. It is granted that the use of morphine, heroin and cocaine lead to serious results both as to the individual's own person and to his relation to society, but so does the use of alcohol and in some measure the use of tobacco, and why should one class of habits be drastically condemned and not the others?

HENRY LEFFMANN.

ORIGINAL ARTICLES

DETERMINATION OF CHLOROFORM IN CHLOROFORM LINIMENT.*

By T. M. Willgerodt.

Chloroform liniment has been one of the U. S. P. preparations most often picked up by State Board inspectors because of the great frequency with which it is found to be under U. S. P. strength. The method which is now popularly employed in determining the chloroform content is based upon the distillation of the chloroform into a graduated cylinder containing water, adding some dilute sulphuric acid

*Plaut Research Laboratory of Lehn & Fink, Inc., Bloomfield, N. J.

and reading the volume of chloroform directly. This method is open to the criticism of giving varying results depending upon the "personal equation" of the analyst. Every analyst who runs such a distillation knows that different results can be obtained depending upon the manner in which the distillation is carried out.

It is obvious that a more exact method would be highly desirable. Acting upon the suggestion of Dr. Moritz Dittmar, of this laboratory, that it might be feasible to base a determination of the chloroform in the liniment upon a conversion of the chloroform into chlorides and determining the latter by the usual Volhardt method, an investigation of this problem was made. The reaction involved employing alcoholic KOH would be as follows:

$$CHCl_3 + 4KOH = 3KCl + 2H_2O + HCOOK.$$

It was first attempted to make this determination by distilling the chloroform from the liniment into alcoholic KOH, but this method was found to give unsatisfactory results. A series of experiments were then begun having as their object the investigation of the best method for determining the chloroform in the liniment directly, thus eliminating the distillation process. As a result of our experimentation, the following method was found to give excellent results:

Method.

Pipette a 5 cc. sample of chloroform liniment into a 100 cc. pressure bottle containing 40 cc. of alcoholic potassium hydroxide. The latter is made by dissolving 30 grams KOH in 30 cc. water, and when cool, adding enough methyl alcohol to make 100 cc. Close bottle, shake, and boil ten minutes in water bath. Start counting the time only when the water is actually boiling. Allow the mixture to cool. Transfer with water into a 500 cc. volumetric flask, make up to volume with water, pipette a 10 cc. portion into a 100 cc. volumetric flask, add a few cc. of nitric acid, add a little water and then 50 cc. of n/10 V. S. silver nitrate. Make up to volume with water. Shake thoroughly. Filter off the chlorides using a dry filter. Take a 50 cc. aliquot portion, add a few cc. ferric ammonium sulphate solution and titrate with a n/10 V. S. potassium thiocyanate. Each cc. of n/10 silver nitrate V. S. is equivalent to 3.98 milligrams of $CHCl_3$.

Experimental Data.

In a sample containing 30 per cent. U. S. P. chloroform of specific gravity 1.476, the following results were obtained:

Cc. Sample	Cc. n/10 $AgNO_3$	$AgNO_3$ Factor	Cc. Thio.	Thio Factor	Gms. $CHCl_3$ per 100 cc.	Per cent. $CHCl_3$
5	50	1.1065	23.60	.9395	44.2974	30.01
"	"	1.0311	19.61	1.0306	44.3372	30.04
"	"	"	19.6	"	44.4168	30.09
"	"	"	"	"	"	"
"	"	"	"	"	"	"

Average 30.06%

In a sample of liniment containing 32 per cent. U. S. P. chloroform of specific gravity 1.476, the following results were obtained:

Cc. Liniment	Cc. Alcoholic KOH	Cc. Ag. NO_3	$AgNO_3$ Factor	Cc. Thio.	Thio Factor	Gms. $CHCl_3$ per 100 cc.	Time of Boiling	Per cent. $CHCl_3$
5	45	50	1.0311	1925	1.0306	47.2824	4 hrs.	32.03
"	"	"	"	"	"	"	"	"
"	"	"	"	19.2	"	47.7600	"	32.36
"	"	"	"	19.21	"	47.6008	"	32.25
"	"	"	"	19.20	"	47.7600	"	32.36
"	"	"	"	19.25	"	47.2824	"	32.03
"	50	"	"	19.2	"	47.7600	2	32.36
"	"	"	"	"	"	47.7600	3	"
"	"	"	"	19.3	"	46.8844	4	31.76
"	"	"	"	"	"	"	5	"
"	"	"	"	"	"	"	6	"
"	"	"	"	19.2	"	47.7600	1	32.36
"	"	"	"	"	"	"	2	"
"	"	"	"	19.25	"	47.2824	3	32.03
"	40	"	"	"	"	"	50 min.	"
"	"	"	"	"	"	"	40 "	"
"	"	"	"	"	"	"	30 "	"
"	"	"	"	"	"	"	20 "	"
"	"	"	"	"	"	"	10 "	"
"	"	"	"	"	"	"	" "	"
"	"	"	"	"	"	"	" "	"

Average 32.09

It will be seen from this table, that a ten minute period of boiling produces satisfactory results.

STUDIES ON THE TOXICITY OF IRON CACODYLATE.

By Peter Masucci, George A. Slothower.

Iron Cacodylate is used extensively where an arsenic tonic is indicated. Sterile solutions of the salt are generally administered intravenously. The salt itself Fe $[(CH_3)_2.AsO.O]_3$ is of doubtful composition and according to Fuller [1] it may be a mixture of iron oxide and cacodylic acid. As it appears on the market various brands differ markedly in physical appearance, solubility and toxicity.

Clinical evidence showed clearly that all the different brands caused more or less abnormal irritation and pain at the site of injection; in some cases the patient became flushed and vomited. Experiments were planned in order to investigate the cause of these undesirable effects.

The ordinary chemical examination of the solutions revealed nothing of note. The reaction of the solution was investigated carefully on the assumption that perhaps the acidity was instrumental in causing the irritation on injection. It was found that reactions between pH 4.5 to pH 6.5 played no part in causing irritation.

On studying the matter further we suspected that the irritation, pain, and systemic symptoms were due to the presence of ionic iron in the solution, and that if we could convert this into colloidal iron the preparation would be much more satisfactory for injection.

Solutions of two brands were made in a concentration of 0.065 gms. in 5 cc. These solutions were dialyzed for several days and it was found that the iron dialyzed almost completely. Parts of these same solutions were treated so as to hydrolyze the solution and convert the iron into colloidal form. Little or no iron dialyzed. The untreated and the hydrolyzed solutions were tested for toxicity by injecting various amounts intravenously into white rats. Much to our surprise, it was found that the toxicity of the hydrolyzed solution or colloidal iron was about one-half that of the untreated solutions.

Table I below gives in detail the microscopic appearance, reaction, and toxicity of the treated and untreated solutions. The dialyzate of the untreated solutions gave a strong positive test for Fe^{+++} with KSCN and $K_4Fe(CN)_6$ where as the hydrolyzed solutions gave a very faint test for Fe^{+++}. Both dialyzates gave a positive test for the cacodyl radicle.

[1] Fuller: *Chemistry and Analysis of Drugs and Medicine,* page 874.

The hydrolyzed solutions have been tested clinically on a large scale. The giving of the drug has not been attended by any objectionable features. There was no abnormal irritation, pain, or systemic reaction.

Conclusions.—The results of this experiment show that Iron Cacodylate as it appears on the market makes solutions which when injected intravenously give rise to abnormal irritation, pain, and systemic reactions. In this form it is unsuitable for injection because the iron is in ionic form and is more irritating and toxic. It was found that by hydrolyzing the salt and converting the iron into the colloidal form, the drug is better adapted for intravenous use. Animal experiments show that the colloidal iron is one-half as toxic as the iron in the ionic state. Clinical results show very conclusively that when the iron is in the colloidal state the administration of the drug is not attended by any objectionable features.

IRON CACODYLATE SOLUTION 0.065 gms. IN 5 cc. NOT DIALYZED.

Preparation.	*Microscopic Examination by Spontaneous Evaporation.*	*pH*	*Toxicity M. L. D. per Kilo Body Weight.*
Untreated Solution Brand A.	Amorphous	4.8 - 5.0	16 mgms.
Hydrolyzed Solution Brand A.	Crystalline Pine Needle Structure	4.8 - 5.0	30 mgms.
Untreated Solution Brand B.	Amorphous	4.6 - 4.8	16 mgms.
Hydrolyzed Solution Brand B.	Crystalline	4.8 - 5.0	36 mgms.

(Pharmaceutical laboratories, H. K. Mulford Company, Philadelphia, Pa., July 31, 1925.)

SOME PLANT GUMS OF THE SOUTHWESTERN UNITED STATES.[1]

By Ernest Anderson, Lila Sands and Nelson Sturgis,
The University of Arizona, Tucson, Arizona.

Cholla Gum.[2]

Occurrence and Appearance.—Cholla gum is found on occasional plants of the white cholla cactus, Opuntia fulgida, which is widely distributed through southern Arizona, New Mexico and northwestern Mexico. A similar gum occurs much less frequently on other species of cholla. The gum occurs most often on large, old, or diseased plants, in round warty lumps varying in size up to an inch in height and two inches in diameter. An average-size lump weighs 25 g., an occasional lump weighs 50 g. and a few have been found weighing 100 g. When the gum first appears on the plant it is soft and somewhat slimy. Soon a hard layer forms over the outside. Gradually it dries out, becomes tough and eventually so hard that it can be broken up in a mortar. At no time is it sticky like fresh resin. It can be readily collected by knocking the lumps into a pail. Where the cacti are thick, a person can collect a gallon pail of the gum, weighing approximately five pounds in an hour.

Physical Properties.—The new lumps are pale yellowish-white in color on the outside. The very old lumps are quite dark outside. When broken open they have a vitreous appearance and vary in color from a pale yellowish-white to a dark red. The gum has a faint but characteristic odor, and taste. The density varies from approximately 1.34 for the soft stage to 1.58 for the old stage. A freshly collected lump, sufficiently hard to be broken but not thoroughly dry, had a density of 1.44. When the finely powdered gum is mixed with fifty times its weight of cold water and allowed to stand for forty-eight hours approximately 40 per cent. of it goes into solution. When a mixture of the gum and water in the above

[1] This is the first of a series of papers by the authors dealing with the chemistry of the plant gums that occur in the southwestern United States. Later papers will deal with the products of hydrolysis of plant gums in general.

[2] The authors have been unable to find any reference in the literature to cholla gum.

proportion is heated in the boiling water bath for ten hours approximately 50 per cent. of it goes into solution. Slightly more of the gum will dissolve in strong sodium hydroxide solution and in strong ammonia solution. Organic solvents such as alcohol, ether, chloroform, ligroin, benzene, carbon tetrachloride, carbon disulfide, and ethyl acetate, dissolve traces of the gum but it is practically insoluble in these solvents. When mixed with ten times its weight of water it swells up to a gelatinous mass.

Chemical Properties.—The following analytical results were obtained on samples of the dry gum, as it came from the plants: Moisture, 8.65 per cent.; ash, 5 per cent.; nitrogen, .40 per cent.; ether extract, .45 per cent.; total reducing sugar after hydrolysis with 4 per cent. H_2SO_4, determined by Fehling's solution and calculated as glucose, 63 per cent.; pentosans, 67 per cent.; galactose calculated from the mucic acid determination, 14 per cent. A sample of the fresh soft gum lost 45 per cent. on drying to constant weight in vacuo over sulfuric acid. Some of the gum was burned at low temperature and the ash analyzed with the following results: SiO_2 3.59 per cent.; unburned carbon, 3.75 per cent.; CO_2 27.57 per cent.; SO_4, 2.97 per cent.; Cl, 4.67 per cent.; P_2O_5, .94 per cent.; CaO, 36.71 per cent.; MgO, 8.7 per cent.; Fe_2O_3 and Al_2O_3, .40 per cent.; Mn_3O_4, .40 per cent.

The water and ammonia solutions of the gum rotate polarized light faintly levo. The water solution is faintly acid to litmus and to methyl red. Both 95 per cent. alcohol and solid ammonium sulfate precipitate some of the gum from its water solution. On the other hand neither ferric chloride nor lead acetate in 10 per cent. solution precipitate the gum. A clear water solution of the gum treated with iodine solution gives no test for starch. However, under the microscope thin sections of the soft gum treated with iodine solution show the presence of a few starch grains. When the finely ground material is mixed with ten times its weight of 4 per cent. sulfuric acid and heated in the boiling water bath for nine hours approximately 11 per cent. remains insoluble and can be filtered off. This insoluble material is chiefly cellulose, much of it consisting of bits of wood from the plant. The authors have isolated crystalline l-arabinose from the products of hydrolysis but this will be dealt with in a later publication. Solutions of the gum in water, ammonia or sodium hydroxide solution do not reduce Fehling's solution. A

white material can be obtained by heating a mixture of the gum and water in the boiling water bath, filtering from the insoluble portion and precipitating the water solution with alcohol.

Cholla gum occurs over a wide area where cheap labor is available for collecting it and large amounts of it would certainly appear on the market if any demand for it arose.

Mesquite Gum.

Mesquite gum is briefly described and references given to the early literature by Remington and Wood.[3] Proctor,[4] Campbell Morfit,[5] and Forbes,[6] have studied the gum slightly.

Occurrence and Appearance.—Mesquite gum is found on the mesquite tree Prosopis juliflora, and other species of mesquite, through a great part of Texas, New Mexico, Arizona and northern Mexico. The gum exudes from the stem and branches in irregular, roundish or vermiform pieces of various sizes. While the lumps are usually small, weighing 5 g. or less, frequently lumps weighing 25 g. are found. These latter may sometimes be half as large as a hen's egg. When the gum first appears it is soft and sticky. At this stage it often runs down the branch. It gradually dries out and becomes hard and so brittle that it can be powdered in a mortar. When the gum is soft and slowly exuding from the branch, the larvæ of flies sometimes live in it.

Physical Properties.—The lumps vary in color from a light amber through a pale yellow to a dark brown. Frequently the lumps are translucent and a large can of the gum will appear very much like a can of rosin. The density of the dry gum is approximately 1.5. It is completely soluble in cold water, only a few bits of wood and other extraneous material remaining undissolved. The solution is quite clear and transparent. Usually several hours must elapse before the gum dissolves completely. When the clear solution is heated in the boiling water bath it becomes cloudy, hence when a solution is prepared for examination with the polariscope it must not be

[3] *The United States Dispensatory*, 20th Ed., 1918.

[4] *Am. J. P.*, **27**, 224 and 542 (1855).

[5] *Am. J. Sc.*, **19**, 264 (1855).

[6] "The Mesquite Tree, Its Products and Uses." Arizona Expt. Station, Bul. 13 (1895).

heated. The water solution is acid to litmus and to methyl red, the pH value determined colorimetrically being approximately 5. The gum is practically insoluble in the ordinary organic solvents.

Chemical Properties.—The following analytical results were obtained on samples of the gum that had been collected and kept in the laboratory for many months: Moisture, 11 per cent.; ash, 2.13 per cent.; nitrogen, .70 per cent.; pentoses from the pentosan determination, 60 per cent.; galactose from the mucic acid determination, 11 per cent.; some of the gum was burned at a low temperature and the ash analyzed with the following results: Unburned carbon, 6.23 per cent.; SiO_2, 4.52 per cent.; CO_2, 29 per cent.; SO_4, 1.42 per cent.; P_2O_5, .35 per cent.; Cl, 4.51 per cent.; CaO, 40.88 per cent.; MgO, 6.71 per cent.; Fe_2O_3 and Al_2O_3, .93 per cent.

The water solution of the gum rotates polarized light strongly dextro. The specific rotation in a 6.38 per cent. solution was found to be + 62 while in a 10 per cent. solution it was found to be + 59. This is very interesting since gum arabic which is similar in many ways to mesquite gum, is strongly levo. A sample of gum arabic examined by the authors for comparison showed a specific rotation of —30.5 in 7 per cent. solution. The water solution of the gum is much less viscous than gum arabic. A 10.16 per cent. water solution of mesquite gum, *i. e.*, 10.16 g. gum made up to 100 cc., was found to be 3.923 times as viscous as water at 29°C. when examiner by the Ostwald viscosimeter.

Mesquite gum in 10 per cent. water solution gives a faint brownish red coloration with ferric chloride solution but no precipitate with either ferric chloride solution or lead acetate solution. The gum is precipitated by 95 per cent. alcohol.

The authors have isolated crystalline l-arabinose in yields of 36.5 per cent. from the products of hydrolysis of the gum. The work on the products of hydrolysis of the gum will be dealt with in separate papers.

Mesquite gum is collected by the Indians and Mexicans and can be obtained in large amounts from drug stores and chemical supply houses in the southwest.

DRUG MARKET REPORT.*

In giving consideration to the subject of drug control and general analytical examination, as practiced in the average pharmaceutical laboratory, we obtain a full appreciation of the large range of substances that are examined. The main reliance is of course upon chemistry, which deals with the composition of matter, the reactions of substances toward each other, and the determination of the relative amounts of their component parts. The science of chemistry is useful in all industries entering into its processes to such an extent that many industries could not function without the chemist in his control and research work. The development of the steel, cement, rubber, glass, food products and other industries, coincides with the researches in chemistry and physics, which fact makes it possible for us to enjoy the wonderful advantages of modern transportation and housing and the release from the laborious conditions existing in former days.

Our chief interest, however, is with pharmaceutical chemistry, which is probably the most diversified, as it requires the use of not only chemistry, but also pharmacy and botany. As its name implies, it deals with the examination of pharmaceuticals and particularly with the examination of substances entering into their preparation. These are quite varied and include crude drugs, oils, fats, waxes, liquors, spices, plant products, chemicals, both organic and inorganic, and many others. The necessity for the examination of these substances needs no demonstration and is imperative, particularly in view of the fact that chemistry has not yet advanced to the point where it is always possible to determine the component parts of a preparation. This is particularly applicable to crude drugs which can not be assayed by chemical or physiological means, for, as we have pointed out in former reports, the use of drugs containing an excess of adhering earth, moisture, or of decayed matter will manifestly yield a preparation of sub-standard strength.

In making our comments upon the general quality of drugs we find that the chief complaint is in regard to crude drugs which Mr. Slothower covers in the following comments.

"Chemicals examined during the past year have generally been found up to standard, but the pharmaceutical crude drug market is

*Reported by Committee on Drug Market, to the 1925 Convention of the Pennsylvania Pharmaceutical Association at Washington, Pennsylvania.

far from satisfactory, and must be rated again this year as poor. The chemical examination of drugs and chemicals often appear as unnecessary work and expense. But the Government chemists in their inspecting and experimental work have often found reagent chemicals not up to standard or even label strength as reported in the *Journal of the A. O. A. C.*, Vol. 8, No. 2, page 106. Since reagent chemicals are frequently not up to standard, it is indeed important that all medicinal chemicals and other materials should be carefully examined."

The most serious condition that is found during the examination of drug products is of course in the substitution of one substance for another. As usual, there has been a number of them this year, some of which have been discussed in former reports, such as the substitution of Ruellia for Spigelia and Bitter Orange Peel for Sweet Orange Peel. Other instances are the substitution of unidentified drugs for Cascara Amarga and Euonymus and a drug thought to be Actaea Rubra for Cimicifuga. Black Catechu was substituted for Gambir, Scutellaria canescens for Scutellaria lateriflora, Bermuda Grass for Triticum and a garden variety of lettuce for Wild Lettuce.

Another condition that is always found is due either to ignorance of standards or carelessness in gathering and marketing such as a shipment of Cataria consisting of stems instead of the dried leaves and flowering tops, Cotton Root Bark and Viburnum containing an excess of wood, Veratrum Alba containing Skunk Cabbage and Squaw Vine containing an excess of various foreign leaves. One lot of Euphorbia contained 28 per cent. instead of "not more than 12 per cent." of earthy material and a sample of Calumba was almost entirely worm-eaten.

Among the alkaloid containing drugs we find that about 75 per cent. were of standard strength. Conspicuous among the sub-standard ones is Aconite Root, as twelve of the twenty-three samples were low in strength. Two lots of Belladonna leaves contained only 2 per cent. alkaloids and a lot of Hyoscyamus contained only .044 per cent. of alkaloids, which is only about one-half of the standard amount.

Substances such as Kino, Catechu, Gambir, Guaiac, Lupulin and others which depend upon their alcohol or ether-soluble constituents for the determination of their value were generally of good quality. Considerable trouble has been experienced in the past with Asafœtida, but this year every lot examined was of U. S. P. quality. Podophyllin,

Lupulin and Kino were also all of standard quality. Guaiac is the only conspicuous offender, as nine of the thirteen samples contained less than 85 per cent. of alcohol-soluble matter.

Reporting upon the condition of spices in general, Mr. Joe W. E. Harrison states that all samples of Allspice, Celery, Coriander, Mace, Mustard (Yellow), Nutmeg, Paprika, Red Pepper, Black Pepper, Savory, Sage, Thyme and Tumeric were all of standard quality. One sample each of Caraway and Cardamon, two of White Pepper and four of Cinnamon yielded an excess of ash. One sample of Jamaica Ginger contained an insufficient amount of cold water-soluble extract and a sample of Rice contained glucose and talc.

In reporting upon conditions in his vicinity, Mr. Blumenschein reports upon original packages of Chlorinated Lime containing but 15 per cent. to 25 per cent. of available chlorine, one sample of Aromatic Spirit of Ammonia containing but 50 per cent. of the standard amounts of ammonium carbonate and ammonium hydroxide, and a sample of Tincture of Iodine made from alcohol containing diethylphthalate. One sample of Tincture of Iodine contained 10.5 gms. of iodine in 100 cc. which is much above the maximum amount of 7.5 gms. as required by the U. S. P.

Other interesting substances that should be considered in our review is found in a shipment of Lithium Carbonate that was incorrectly labelled, a sample of apparently suspicious Lavender Oil and a lot of Coal Tar substituted for Pine Tar.

Safeguarding the quality of pharmaceutical preparations involves considerable contrasts ranging from the determination of minute quantities such as the determination of arsenic in glycerine which involves the separation of .002 milligram of arsenic from 200 milligrams of glycerin, to the determination of the strength of chemicals which are approximately 100 per cent. pure. Another illustration is seen in the assay of Hyoscyamus in which 30 gms.—about 1 oz.—of the drug are used to obtain 9.7 milligrams—about one-seventh grain of alkaloid. These and similar examinations are absolutely necessary not only to insure the purity of the ingredients but as a means of ascertaining the amount of the active principal in the alkaloid containing drugs. They are important also from the standpoint of cost control, as the loss of 0.1 per cent. of alkaloids in the manufacture of 100 lbs. of such a preparation as P. E. Belladonna or an equivalent error on the part of the chemist making the assay will entail a considerable financial loss. But they are, no doubt, more

important from a therapeutic standpoint, as the physician, after he has made his diagnosis, places his chief reliance on the medicines he prescribes and if these are not of standard quality it becomes a very serious matter and may result fatally. This reason alone provides the most forceful argument against the competition of cheap, sub-standard preparations.

(The following data covers the period from June 1, 1924, to May 31, 1925, and was compiled from the files of the H. K. Mulford Company, the LaWall and the Smith, Kline & French Company laboratories.)

Acetone.

Samples of this chemical are frequently not perfectly miscible with water as required of U. S. P. Acetone.

W. PAYNE.

Acid Hydrochloric.

One lot was light yellowish-green in color and showed upon examination to contain a trace of iron.

J. DAILEY.

Aletria.

The total ash content of one sample was 31 per cent. The N. F. standard is not more than 16 per cent. ash.

H. ENGSTROM.

Ammonium Carbonate.

The analysis of one sample of Lump Ammonium Carbonate showed the presence of only 22.1 per cent. ammonia whereas the U. S. P. requires 30-32 per cent. ammonia.

J. FARLEY.

Ammonia Water.

A two-drum shipment was found to be of U. S. P. quality except that it had a reddish-yellow color. The material in each drum was different in appearance, which strengthened the conclusion that it had been placed in dirty drums.

J. G. ROBERTS.

Asafœtida.

The six lots examined contained 70.9 per cent., 71 per cent., 69.14 per cent., 72.1 per cent., 65.8 per cent. and 63 per cent. of alcohol-

soluble matter. As the U. S. P. requires 60 per cent alcohol-soluble matter, it is seen that all of the samples are well above the U. S. P. limit.

R. BERESFORD.

Benzyl Alcohol.

The examination of samples of benzyl alcohol show that they are not soluble in water to the extent of the N. N. R. standard of 4 per cent. The average solubility of commercial samples is about 2 per cent.

J. FARLEY.

Benzoin.

Fourteen samples of Sumatra Benzoin assayed 75.7 per cent., 76 per cent., 79.5 per cent., 71.4 per cent., 80.7 per cent., 75.7 per cent., 85.5 per cent., 78.7 per cent., 72 per cent., 75.8 per cent., 88.6 per cent., 79.54 per cent., 77.51 per cent. and 73.02 per cent. alcohol-soluble constituents. The U. S. P. standard for Sumatra Benzoin is not less than 75 per cent. alcohol-soluble matter. All but three of the samples are of U. S. P. quality.

K. SUTO.

Belladonna Leaves.

One lot contained only .2 per cent. of alkaloids. Other lots ranged between .40 and .47 per cent.

J. G. ROBERTS.

Calumba.

One sample consisted almost entirely of worm-eaten drug.

H. ENGSTROM.

Cascara Amarga.

A spurious drug is continually being offered for the genuine drug as reported in last year's report.

G. SLOTHOWER.

Cataria.

One sample consisted mostly of stems whereas the N. F. requires Catnep to consist of "the dried leaves and flowering tops."

H. ENGSTROM.

Catechu.

The three lots examined yielded 85 per.cent., 72.62 per cent. and 88.42 per cent. matter soluble in 90 per cent. alcohol. The B. P. requires it to contain not less than 80 per cent. of matter soluble in 90 per cent. alcohol.

K. SUTO.

Cimicifuga.

The botanical examination of a sample of this root showed the presence of a foreign root. Actaea rubia is the suspected contamination.

G. SLOTHOWER.

Chloroform.

Slightly excessive amounts of chlorinated decomposition products and impurities decomposable by sulphuric acid were found in three of the four lots examined.

T. R. SINGER.

Euonymus.

One sample consisted entirely of a foreign bark. This spurious bark has not been identified and appears to be a new adulterant for Euonymus.

G. SLOTHOWER.

Euphorbia Pilulifera.

The ash content of one sample was 28 per cent. The N. F. permits not more than 12 per cent. of ash.

H. ENGSTROM.

Gambir.

The two lots examined contained 76.35 per cent. and 79.01 per cent. of alcohol-soluble constituents. The U. S. P. requires not less than 60 per cent. soluble matter. Another sample submitted for Gambir proved to be Black Catechu.

K. SUTO.

Gossypii Cortex.

One sample contained 14.4 per cent. of wood, whereas the N. F. limits wood and foreign matter to 5 per cent.

H. ENGSTROM.

Guaiac.

The following amounts of alcohol-soluble constituents were found in the thirteen samples examined: 89 per cent., 83.7 per cent., 68 per cent., 79.5 per cent., 82.6 per cent., 75.2 per cent., 87.2 per cent., 87.1 per cent., 91.18 per cent., 83.5 per cent., 67.14 per cent. and 81.78 per cent. alcohol-soluble constituents. The U. S. P. requires not less than 85 per cent. of alcohol-soluble constituents.

K. SUTO.

Kino.

The only lot of Kino examined yielded 47.96 per cent. of alcohol-soluble matter. The U. S. P. requires not less than 45 per cent. of alcohol-soluble constituents.

J. FARLEY.

Hyoscyamus.

One lot was found to be about one-half the U. S. P. strength, as it contained only .044 per cent. of alkaloids.

J. G. ROBERTS.

Lavender Oil.

One sample showed an optical rotion of $+3^\circ$ 42′ at 25°C. in a 100 mm. tube. French and English Lavender oils are laevo-rotatory. The specific gravity of the sample was .873 @ 25°C. which is a little lower than the U. S. P. standard of .875— .888 @ 25°C. Evaporation of several drops of the oil on filter paper left no stain but had a distinct odor of turpentine.

H. ENGSTROM.

Lupulin.

The one lot examined yielded 65 per cent. of ether-soluble matter. The N. F. requires 60 per cent. of ether-soluble matter.

R. BERESFORD.

Lithium Carbonate.

The carton in which one shipment was received was labelled barium sulphate, but as the packages themselves were correctly labelled it is a clear case of careless packing.

T. R. SINGER.

Myrrh.

Eighteen samples of gum myrrh yielded the following amounts of alcohol-soluble constituents: 40.76 per cent., 50.4 per cent., 43.9 per cent., 48.76 per cent., 52.8 per cent., 53 per cent., 51.2 per cent., 45.1 per cent., 39.2 per cent., 48.7 per cent., 40.3 per cent., 34.07 per cent., 34.33 per cent., 39.28 per cent., 40.21 per cent., 42.01 per cent., 44.7 per cent. and 42.05 per cent. The U. S. P. requires not less than 35 per cent. of alcohol-soluble constituents.

K. SUTO.

Pine Tar.

A sample submitted as Pine tar proved upon analysis to be ordinary Coal Tar.

R. BERESFORD.

Podophyllin.

Five samples were soluble to the following extent:

Sample #1	80.8%	chloroform	91%	Ether
" #2	80.8%	"	85%	"
" #3	80%	"	84%	"
" #4	74.8%	"	78.6%	"
" #5	72.4%	"	80.6%	"
U. S. P. Std.	65%	"	75%	"

J. FARLEY.

Scutellaria.

One lot offered for Skullcap showed upon analysis to consist entirely of Western Skullcap, Scutellaria canescens, which is not the official variety.

G. SLOTHOWER.

Soap-Soft.

Two lots were found to contain about 3.5 per cent. excess of water. One shipment contained less than the U. S. P. minimum amount of .1 per cent. of potassium hydroxide.

T. R. SINGER.

Sodium Phosphate.

One lot did not yield a clear aqueous solution, and contained chlorides in excess of the U. S. P. limit.

J. DAILEY.

Spigelia.

It has been very difficult to obtain satisfactory Spigelia during the past year. One sample consisted entirely of Ruellia while another sample was contaminated with Ruellia and Helonias.

H. ENGSTROM.

Squaw Vine.

One sample contained an excessive amount of various foreign leaves, which is an indication of very careless gathering.

G. SLOTHOWER.

Styrax.

Seven samples yielded the following results:

	Alc. Sol.	*Alc. Insol.*	*Acid Value*	*Saponification*	*Ash*	*Odor*
Sample #1	77%	2.6%	83.5	..	.54%	Good
" #2	69.9%	2.9%	71.9	..	.8%	"
" #3	69.1%	2.95%	69.6	..	.9%	"
" #4	73.8%	2.3%	68.2	..	.27%	"
" #5	..	2.02%	68.3	194	..	"
" #6	68.7%	3.3%	75.0	193	.28%	"
" #7	70.4%	2.4%	68.5	191	non-weighable	"

J. FARLEY.

Sweet Orange Peel.

Submitted as sweet orange peal the sample on botanical examination proved to be bitter orange peel.

H. ENGSTROM.

Terpin Hydrate.

A broker's sample yielded .2 per cent. ash instead of not more than .05 per cent. as required by the U. S. P.

T. R. SINGER.

Turpentine.

Two of the four samples were found to be adulterated with mineral spirits.

Jos. W. E. HARRISSON.

Triticum.

During the past year Bermuda Grass has again been offered for Triticum.

G. SLOTHOWER.

Veratrum Alba.

The botanical examination of one sample of this drug showed the presence of skunk cabbage contamination.

G. SLOTHOWER.

Viburnum Prunifolium.

Three samples contained respectively 10 per cent., 15 per cent. and 20 per cent. adhering wood, which is in excess of the U. S. P. limit of 5 per cent. foreign matter.

H. ENGSTROM.

Viburnum Opulus.

Acer barks have been offered during the past year for the official Viburnum opulus.

H. ENGSTROM.

Wild Lettuce.

One sample consisted entirely of a garden variety of lettuce and not the flowering herb of Lactuca virosa.

G. SLOTHOWER.

Zinc Stearate.

One consignment was of U. S. P. quality except that it contained an excess of zinc to the extent of 2 per cent. when calculated as zinc oxide.

T. R. SINGER.

The following table shows the fourth report on the weight of unit volume of crude drugs made in the Analytical Department of the H. K. Mulford Company during the year June 1, 1924, to June 1, 1925.

Drug.	*Volume cc.*	*Weight gms.*	*Average* 1924-25.	1921-24.	*Remarks.*
Angelica Seed	100	13.66			
	"	13.			
	"	14.	13.55	14.8	
Caraway Seed	"	48.1	48.1	48.9	
Cardamon	"	65.6			
	"	67.3	66.4	67.75	
Celery Seed	"	50.5			
	"	47.6	49.0		
Colchicum Seed	"	74.6	74.6	73.6	
Ergot	200	94.5			
	"	93.			
	"	96.5			
	"	95.3			
	"	93.			
	"	92.			
	"	94.			
	"	96.			
	"	97.5	94.6	94.1	
Juniper Berries	"	73.			
	"	76.			
	"	75.			
	"	66.5			
	"	66.8			
	"	66.9	70.7	71.0	
Larkspur	100	43.			
	"	42.			
	"	42.5			
	"	42.1	42.4	45.2	
Strophanthus	200	89.4	89.4		

—Reported by G. SLOTHOWER.

The following table shows the results of chemical assays of 156 crude drugs made in the Analytical Department of the H. K. Mulford Company during the year June 1, 1924, to June 1, 1925:

Drug.	*#Samples.*	*Lowest Per Cent.*	*Highest Per Cent.*	*Average Per Cent.*	*Standard.*	*#Above.*	*#Below.*
Aconite Root	23	.296	.83	.494	0.5% Alks.	11	12
Aspidium	1	6.94	6.94	6.94	6.00% Oleoresin	1	0
Aspidosperma	2	1.45	1.55	1.50	1% Alks.	2	0
Belladonna Lvs.	9	.201	.60	.433	0.3% Alks.	8	1
Belladonna Rt.	12	.477	.70	.586	0.45% Alks.	12	0
Cantharides	4	.528	.94	.744	0.60% Cantheridin	3	1
Capsicum	7	10.38	16.69	15.96	15% N. V. E. Sol.	4	3
Colchicum Corn	6	.284	.356	.324	0.35% Colchicine	1	5
Colchicum Seed	5	.48	.55	.511	0.45% Colchicine	5	0
Guarana	3	3.98	4.82	4.32	4% Caffeine	2	1
Hydrastis	5	2.8	3.95	3.31	2.5% Alks.	5	0
Hyoscyamus	10	.0718	.148	.112	0.065% Alks.	10	0
Ipecac	12	1.7	2.57	2.19	1.75% Alks.	11	1
Jalap	16	5.8	13.26	8.0	7% Total Resin	10	6
Kola Nuts Dried	4	1.5	1.78	1.61	1.5% Caffeine	4	0
Nux Vomica	12	2.55	3.26	2.82	2.5% Alks.	12	0
Opium Powder	8	10.03	10.90	10.60	10% Morphine	8	0
Physostigma	1	.134	.134	.134	0.15% Alks.	1	0
Pilocarpus	7	.61	1.07	.92	.6% Alks.	7	0
Sanguinaria	4	2.56	6.05	3.89	2.5% Alks.	4	0
Stramonium	5	.275	.47	.352	0.25% Alks.	5	0
Total	156					126	30

Comparison With Reports Previously Submitted.

Year.	*Total.*	*Above.*	*Below.*	*Per Cent. Above.*
1915 Report.....	133	98	35	73.6
1916 "	215	156	58	72.9
1917 "	172	147	25	85.3
1918 "	131	113	18	86.8
1919 "	206	173	33	83.9
1920 "	211	173	38	81.9
1921 "	217	179	38	82.4
1922 "	96	76	20	79.1
1923 "	144	114	30	79.1
1924 "	99	91	8	91.9
1925 "	156	126	30	80.7

Last year Belladonna Root and Colchicum Corm were the only drugs one-half or more of which ran below standard. This report shows Aconite root, Capsicum and Jalap drug one-half or more assaying below standard.

—Reported by G. SLOTHOWER.

The following table shows the results of physiological assay of thirteen crude drugs made in the Physiological Testing Department of the H. K. Mulford Company, during the year June 1, 1924, to June 1, 1925.

Drug.	*#Samples.*	*Lowest Assay.*	*Highest Assay.*	*Average.*	*#Above.*	*#Below.*
Cannabis	1	136%	136%	136%	1	..
Digitalis	2	200%	250%	225%	2	..
Ergot	10	120%	280%	169%	10	..
Total	13				13	..

Therefore, 100 per cent. of the crude drugs were above standard.

—Reported by PETER MASUCCI.

GEORGE SLOTHOWER,
JOSEPH W. E. HARRISSON,
F. S. BLUMENSCHEIN,
J. G. ROBERTS,
Chairman.

INTERNATIONAL CONFERENCES.

Pharmacy and the Allied Sciences.

Three international conferences were held abroad this summer.

(1) *The International Pharmaceutical Federation* met at Lausanne, Switzerland, July 21 to 23, 1925. Dr. Arno Viehoever attended as a delegate from the American Pharmaceutical Association.

(2) A conference to attempt further international harmony in the standards for potent remedies was called at Brussels on September 21, 1925. Dr. A. G. Du Mez, was appointed an official representative of the Public Health Service of the United States Government, where he also officially represented the Committee of Revision of the United States Pharmacopœia, at the invitation of the Board of Trustees.

The Brussels' Conference of 1902 resulted in the P. I. standards now largely adopted by the pharmacopœias of the world. The U. S. P. 1920 Convention recognized the need for a new conference.

(3) *The Conference of the Section on Biological Standardization of the Health Committee of the League of Nations* at Geneva, in the early part of September.

The program of the Assembly, International Pharmaceutical Federation was as follows:

Monday, July 20th, 2.30 P. M. Session of the Bureau.

Tuesday, July 21st, 10 A. M. General Assembly.

1. Regulation of specialties
2. International nomenclature
3. Traffic in stupefactives and poisons in general
4. Pharmacy in the small communities
5. Proposition of the Bureau to found two sections of the International Pharmaceutical Federation; one professional section and one scientific section
6. Proposition of the Bureau to have the *International Correspondence Journal* appear every three months and to appoint correspondents in every country
7. Propositions of the effective members
8. International scientific questions.
   The unification of methods of determining the value of drugs and other medicaments.

Wednesday, July 22d. International scientific questions (continuation).

Prof. Eder—Zurich. Subject: "A New Method of Determining Morphine in Opium" (in German).

Prof. Greenish—London. Subject: "Unification of the Methods of Assaying Potent Drugs" (in English).

Prof. Tschirch—Berne. Subject: "The Scientific Bases of Galenic Pharmacy" (in French).

Prof. Wilczek—Lausanne. Subject: "Anatomical Particulars on the Bark of Frangula" (in French).

Dr. Gokaz—Vevey, and Dr. Siegfried—Zefingen. Subject: "International Methods of Determining the Value of Galenic Preparations" (in French).

Davis. Subject: "From the International Bulletin of Origin Obligatory for the Chemical and Biological Products not Registered in the Pharmacopœias" (in French).

Prof. Wilczek and Prof. Mellet—Lausanne. Subject: "Glucosides Giving Rise to Alcannine" (in French).

(This Journal will present a report of this Conference in a later issue.)

The Second Brussels' Conference.

Dr. Du Mez has kindly supplied a translation of the tentative program for the Second Brussels' Conference called for the Adoption of International Agreements upon the Standards of Potent Remedies. It is as folows:

Tentative Program of the Second Brussels' Conference.

First Topic.—Revision of the decisions made by the First Conference.

Certain of the standards set by the First Conference held in Brussels in 1902 were not adopted by all of the pharmacopœias; others were the subject of criticism. The following are cited as falling in these classes: Tincture of Opium, Tincture of Strophanthus, Tincture of Iodine, Syrup of Ipecac, Mercurial Ointment, and the general method adopted for the preparation of tinctures of heroic medicaments.

Second Topic.—Unification of the composition of other heroic medicaments.

The First Brussels' Conference fixed the active-principle content of a certain number of medicaments.

The next Conference should endeavor to extend the accomplishments of the First Conference along this line to the unification of the composition of other medicaments. It should concern itself particularly with the medicaments upon which the First Conference failed to reach an agreement, and it should take under consideration the advisability of the unification of certain other preparations which were not acted upon by the first conference. Notably the following:

Preparations of Strophanthus
Preparations of Hydrastis Canadensis
Preparations of Cinchona
Adrenaline
Aconite Root
Belladonna Leaf, Tincture and Extract

Colchicum Seed
Digitalis Leaf and Tincture
Ipecac Tincture

Third Topic.—Unification of arsenic and bismuth preparations.

It is desirable to fix as nearly as possible the composition of the arsenic and bismuth preparations, or at least to fix the arsenic and bismuth contents and the toxicity of these preparations.

Fourth Topic.—Is it desirable to unify the chemical assay methods for certain medicaments?

Is it not desirable to reduce as soon as possible the different methods now directed to be used in assaying certain drugs to a single formula?

In general the assay methods now prescribed are not of sufficient exactness to permit of accepting the results obtained without reservations. For instance, the Belgian Pharmacopœia prescribes assay methods for the active constituent, or constituents, of certain pharmaceutical preparations. The methods directed to be used are not always of sufficient exactitude if the preparations analyzed possess a composition near to that of the preparation provided for. This affirmation is supported by the following example from the Pharmacopœia: "If in the course of the preparation of powdered opium, the practitioner is obliged to mix equal parts of opium containing 13 per cent. of morphine and of opium containing 7 per cent. of morphine, a new assay of the powder must be made and the powder cannot be accepted as conforming to the Pharmacopœia, until the second assay indicates a morphine content of 10 per cent."

It is certainly not without serious reasons and without precise documentation that the Pharmacopœia prescribes this cautious procedure; and what is said of opium is applicable to many analogues.

But, if the assay of morphine practiced successively by one and the same method admits of an error sufficiently marked to require a new assay before a mixture of equal parts of opium containing 13 per cent. of morphine and opium containing 7 per cent. of morphine can be accepted as containing 10 per cent. of morphine, what must be the result when the same determinations are made by different methods?

How do the results of the assay of opium obtained by the gravimetric method of the Belgian Pharmacopœia compare with the results obtained by the titration methods of the Swiss and German pharma-

copœias, or with those obtained in applying the line methods of the Netherlands and French pharmacopœias, inasmuch as the French Pharmacopœia directs that the morphine be weighed and the Netherlands Pharmacopœia directs that it be titrated?

What has been said of opium is justified by its primordial importance, but it certainly can be repeated for many of the other internal medicaments, *viz.*: aconite, belladonna, hyoscyamus, cinchona, coca, colchicum, digitalis, ipecac, nux vomica, etc., whether it be for the drugs themselves or for the preparations derived from them.

In resumé, having regard for the great desirability of insuring uniform composition of the heroic medicaments, not only in the pharmacies of the same nation, but also in the different civilized countries, it follows that the unification of chemical assay methods of certain medicaments should be given consideration by the delegates of the various countries at the next conference.

Unification being an ideal difficult to realize, the first concern of the conference should be to determine to what degree this can be most easily and rapidly accomplished.

To establish uniform assay methods, it will be necessary to appoint a committee or delegate, a chemist, to investigate the methods in use with the view to determining the best one in each case. This would be the beginning of an immense comparative work carefully carried out by each of the committees of revision of the various pharmacopœias. This procedure runs the risk of becoming drawn out, provoking long discussions and of never giving general satisfaction.

Consequently, the conference should not limit itself to a too restricted role, but should treat the subject from a practical standpoint. Its action should consist of the following:

1. To determine which of the assay methods of the therapeutically important medicaments of the various pharmacopœias differ to such an extent that the patient is seriously endangered.

2. These medicaments and these pharmacopœias being designated, two methods of procedure may be followed:

a. The mildest procedure would be to induce the countries which use the methods differing to the greatest extent (in the results yielded) to choose another from among a certain number of sufficiently concordant methods.

b. The more radical procedure would consist in choosing a single method applicable to all countries.

The conference may at the outset decide to unify all of the methods. It would then be superfluous to make up a list of medicaments differing too profoundly in their essay as outlined in No. 1.

Summing up:—The work of the conference in the unification of assay methods should be limited to a choice between the methods of the different pharmacopœias, or to determine the procedure for making the choice, rather than a study of the methods themselves.

Fifth Topic.—Is it desirable to adopt biologic methods of assay and to unify them?

Chemical methods are not applicable to the standardization of a series of medicaments, the active principles of which have not been isolated, *e. g.,* pituitary extract and insulin. In another series, the active principles isolated up to the present do not represent the activity of the whole drug, *e. g.,* digitalis, because of alterations during the process of isolation or from other causes. A third case is represented by optically active substances, such as hyoscyamine and adrenaline, the optical isomers of which differ in their physiologic or therapeutic actions and the chemical analysis of which fails to identify the optical isomer.

Under these circumstances biologic methods furnish at the present time the best means of evaluating those medicaments.

The Section on Hygiene of the League of Nations has charged a special committee to study the physiologic methods for the standardization of certain remedies: digitalis, belladonna, insulin, ergot and pituitary extract. The conference should consider to what extent it is desirable to include these methods in the diverse pharmacopœias.

The examination of this question should naturally be effected in intimate coöperation with the Committee of Hygiene of the League of Nations, which has assembled considerable experimental data on the subject.

Moreover, this committee has decided to make a report on its work relative to the unification and standardization of the biologic assay methods.

Sixth Topic.—Unification of maximum doses.

By maximum dose should be understood the dose which in the dispensing of medicaments by the pharmacist cannot be exceeded unless directed by the physician.

The diverse pharmacopœias give different maximum doses for the same products. This is inconvenient.

The pharmacopœias should furthermore indicate the methods and channels of administration to which the maximum doses apply.

Seventh Topic.—Consideration of the proposition to adopt special containers for dispensing medicaments which will indicate by their form or other peculiarity whether the contents are intended for internal or external use.

Is it desirable, for example, to reserve for external remedies bottles with a polygonal cross section and for internal remedies bottles cylindrical or oval in cross section?

Eighth Topic.—International regulation of the traffic in narcotics.

The indications are that this topic will be deleted from the program. The British Government has objected to this topic since the League of Nations has called two conferences for the purpose of studying and solving this problem.

Ninth Topic.—Examination of the project to create a permanent international secretariat of pharmacopœias.

The creation of a permanent secretariat was made the subject of the order of the day following the First International Conference held in Brussels in 1902.

The conference expressed the wish that the Government of Belgium would establish a permanent secretariat of pharmacopœias and that the governments of all of the countries represented would designate correspondents, preferably members of their respective committees of revision, with whom the secretary could communicate directly for the purpose of developing uniformity of medicaments in general. This permanent institution would take the name of "Secretariate international pour l'unification des pharmacopœias."

Since then, the Congress of Pharmacy held in The Hague in 1913 took up the subject and elaborated a program for this Secretariat.

The Fédération pharmaceutique internationale has several times requested the Belgian Government to call a conference of official delegates to discuss and settle this matter.

These are the reasons why this topic has been given a place on the program of the second conference.

The conference should not only decide upon the mode of opera-

tion of the secretariat, but also upon the principles upon which the institution will be founded.

In so far as the eventual activities of the permanent secretariat are concerned, the two programs submitted to the "Fédération internationale" by Van Itallie and Tschirch, respectively, are of interest.

The project of Van Itallie proposes to fix as follows the work of this bureau or international secretariat:

1. Elaboration of such amendments and additions to the Brussels' Convention as concern the formulæ of heroic remedies.

2. Investigation of the methods for determining the active principles of heroic remedies and the submission of recommendations for fixing the active principle contents of these remedies.

3. Formulation of propositions which will lead to unifomity in pharmacopœial nomenclature.

4. Projection of propositions which will permit of arriving at uniformity in the descriptions of chemical products, their identification, analysis, *et cetera,* in the diverse pharmacopœias.

The following is the project of Tschirch:

1. Collection of all the articles of interest on pharmacopœias appearing in the journals and the publication annually of a volume of abstracts in German, French and English.

2. Comparison and verification of all methods for the determination of the active principles of drugs, principally of the heroic drugs, but also of the chemical medicaments, and publication of the results in such a manner that the reports will be continuous.

3. Elaboration, with the foregoing work as a basis of projects for the regulation of and special decisions on all the articles of the pharmacopœias which lend themselves to international regulation. These projects should then be submitted to the different governments represented at international conferences, where they should be discussed and adopted or rejected.

4. The office should also interest itself in international nomenclature and other analogous questions.

These two programs (those of Van Itallie and Tschirch) appear to be identical in scope, but to differ essentially in their practical realization.

While the project of Van Itallie makes use of scientific laboratories already in existence, that of Tschirch, on the contrary, requires a special laboratory annexed to the secretariat.

The "Fédération internationale pharmaceutique" has pronounced itself in favor of Van Itallie's project.

Other propositions should be discussed without extending the range, such as the execution, pure and simple, of the desire expressed in 1902.

Tenth Topic.—Adoption of an international nomenclature for pharmacopœias.

This topic has been added to the program at the request of the Swedish Government.

The conference in 1902 unified the nomenclature of a certain number of medicaments. The first article of the convention stipulated the following:

> "The substances enumerated above should be designated by the following Latin titles":

This unification does not apply only to the preparations for which the conference has regulated the formula, but also to certain medicaments used in making these preparations.

The second conference should examine the possibility of extending this accord.

It would be idle and foolish to elaborate a complete work comprising all of the medicaments.

But, is it not desirable to proscribe certain common titles when the same title is used to designate different substances? For example:

"White Precipitate," which is used in some instances to designate mercurous chloride and in others to designate ammoniated mercury.

"Yellow Precipitate" applied to both the yellow oxide of mercury and the basic sulphate of mercury.

The agreement reached should furnsh certain general directions; the conference should decide, for example:

If it is desirable to adopt Latin as the nomenclature for medicaments;

If it is desirable to begin the titles of salts with the name of the cation or of the anion;

If it is desirable to exclude from the official nomenclature commercial names registered as trademarks and whether or not these names should be included among the synonyms.

RECOMMENDATIONS FROM THE COMMITTEE OF REVISION OF THE UNITED STATES PHARMACOPŒIA FOR THE CONSIDERATION OF THE SECOND BRUSSELS' CONFERENCE.

(Presented at the Invitation and Through the Courtesy of the Official Delegate of the United States Government, Dr. A. G. Du Mez.)

In response to the invitation of the United States Government for recommendations to be presented to the Second Conference Internationale pour l'Unification de la Formule des Médicaments Héroïques, to be held at Brussels, September 21, 1925, the Committee of Revision of the Pharmacopœia of the United States submits the following recommendations:

1. Concerning a Revision of the Decisions Made by the First Conference.

ARTICLE I.

Nomenclature.—This question is discussed and recommendations made under Item 10 of the tentative program.

Defintion of the drug.—We believe it more important in the limiting definition of drugs to establish alkaloid or biological standards rather than to exact limitations regarding tailings, or the presence of stems or other plant parts, the control of which is not always within the province of the pharmacist.

Statements concerning the limitation of the use of a drug, depending upon the time lapsing since its collection, are not enforceable, as such factors cannot be determined and are furthermore of relatively little importance with drugs which can be assayed.

We recommend the definite chemical standards be fixed for all drugs for which reliable processes of assay are available and, for such drugs as do not lend themselves to chemical assay, that biological assays be introduced if feasible.

The United States Pharmacopœia, Tenth Revision, has standardized the following drugs and preparations by chemical methods, and we recommend their consideration for international agreement:

Aspidium

Oleoresin Aspidii

Belladonna Folia
Extractum Belladonnæ
Tinctura Belladonnæ
Fluidextractum Belladonnæ Foliorum

Belladonna Radix
Fluidextractum Belladonnæ Radicis
Emplastrum Belladonnæ

Cinchona
Fluidextractum Cinchonæ
Tinctura Cinchonæ
Tinctura Cinchonæ Compositæ

Colchici Semen
Extractum Colchici
Fluidextractum Colchici
Tinctura Colchici

Hydrastis
Fluidextractum Hydrastis

Hyoscyamus
Extractum Hyoscyamus
Fluidextractum Hyoscyamus
Tinctura Hyoscami

Ipecacuanha
Fluidextractum Ipecacuanha

Ipomœa

Jalapa

Nux Vomica
Extractum Nucis Vomicæ
Tinctura Nucis Vomicæ

Opium
Tinctura Opii

Podophyllum

Stramonium
Extractum Stramonii
Tinctura Stramonii

Biological assays have been adopted by the U. S. P. X. for the following drugs and preparations:

Aconita

Aconitina

Aconitum
Tinctura Aconiti

Cannabis
Extractum Cannabis
Fluidextractum Cannabis

Digitalis
Tinctura Digitalis

Liquor Epinephrini Chloridi

Ergota
Fluidextractum Ergotæ

Liquor Pituitarii

Scilla
Tinctura Scillæ

Strophanthus
Tinctura Strophanthi

Type samples conforming to the Pharmacopœial requirements, for these biologically standardized drugs are being supplied to manufacturing pharmacists by the United States Bureau of Chemistry, for the purpose of establishing greater uniformity in this class of medicaments.

We also recommend that suitable steps be taken for the establishment of an international agreement upon acid-insoluble ash standards and descriptions of microscopic elements for vegetable drugs and after those of the U. S. P. X. as a basis for comparison. Agreements should also be reached upon the meaning of terms used in describing the degree of fineness of ground and powdered drugs. The U. S. P. X. has established new definitions and standards after an extensive study of commercial conditions. It would be desirable to form international committees to study all of these standards and to recommend a basis for agreement.

ARTICLE II.

a. The discontinuance of medicinal wines has met with approval in pharmacy in the United States, and all medicinal wines have been excluded from the Pharmacopœia.

b. While the adoption of 10 per cent. strength for tinctures of potent drugs has proven generally advantageous, and should be retained as the maximum strength, there are some cases in which no per cent. strength is impossible or undesirable and we recommend that exceptions to this maximum standard be made where the character of the drug makes this desirable.

For example, the active constituents of cantharides are not sufficiently soluble in any of the menstrua proposed to make a tincture fully representing 10 per cent. drug strength. Possibly a 5 per cent. tincture would serve the need for such a preparation and would be practicable. The addition of acetic acid to the menstruum for tincture of cantharides increases the amount of cantharidin extracted.

c. The 100 per cent. strength for fluidextracts is approved if the percentage is stated upon a weight-volume basis.

Alcoholic Per Cent. Menstruum.

The attempt to establish the alcoholic strength of menstrua is a refinement of detail, especially for assayed preparations, and may well be left to the revisers of the several national Pharmacopœias.

The prime factors to be considered are the extraction of the drug and the permanency of the finished preparation; standardizing the percentage of alcohol is of secondary importance. For example, in the 1906 protocol the Tincture of Opium is directed to be made with 70 per cent. alcohol. The alcohol in this preparation serves primarily as a preservative and is not required for the extraction of the drug. Consequently, it can be reduced to 20 per cent. alcohol by volume, which is ample for that purpose.

Manufacturing Processes.

The method of manufacture, whether by percolation or maceration, is likewise a matter to be left to the judgment of the individual pharmacopœial revised committees.

Parts by Weight.

The custom of manufacturing liquid galenicals by volume and not by weight is so thoroughly established in the United States that

it cannot be displaced by a percentage or weight system and under these conditions it seems necessary to make a reservation that this established system of the United States may be retained. For all practical purposes the products of either system are therapeutically identical.

ARTICLE III.

The United States Committee believe that the consideration of a standard drop measure is beyond the scope of the Brussels' Conference.

2. Unification of the Composition of Other Potent Medicaments.

We recommend that the Brussels' Conference establish international standards for additional important therapeutic agents, and suggest the following specific titles:

Acidum Hydrochloricum
Acidum Nitricum
Acidum Phosphoricum
Acidum Sulphuricum
Aconitina
Antitoxinum Diphthericum
Antitoxinum Tetanicum
Arsphenamina
Barii Sulphas
Cinchona and its preparations
Diluted Acids
Hydrastis and its preparations
Liquor Epinephrini Hydrochloridi
Liquor Pituitarii
Liquor Potassii Hydroxidi
Liquor Sodii Hydroxidi
Neoarsphenamina
Scilla and its preparations
Spiritis Aethylis Nitritis
Spiritus Glycerilis Nitratis
Thyroideum
Tincture Ferri Chloridi
Vaccinum Variolæ

3. Unification of Arsenic and Bismuth Preparations.

It is desirable to reach international agreement upon the standards for arsenical preparations, both inorganic and organic.

We do not see the necessity for international agreement upon standards for bismuth preparations. If preparations for injection are intended there is apparently no official preparation in any of the pharmacopœias to be used as a basis for agreement.

4. Is It Desirable to Unify the Chemical Assay Methods for Certain Medicaments?

We recommend that a comparison of the various methods of estimating alkaloidal content by the gravimetric method by titrating

should be made a matter of thorough international research. In the adoption of standard methods, the degree of expected accuracy or concordance in results should be determined.

The method selected for determining the standard processes of assay should be left for a careful consideration of all information and data available.

Where possible, tests for the identification of the materials isolated in the assays should be adopted.

5. Is It Desirable to Adopt Biologic Methods of Assay and to Unify Them?

We recommend that bio-assay methods be adopted for such drugs as cannot be assayed chemically, if bio-assays are feasible. We believe that preference should be given to the recommendation of the Biological Products Conference of the Health Committee of the League of Nations.

6. Unification of Maximum Doses
and
7. Consideration of the Proposition to Adopt Special Containers for Dispensing Medicaments Which Will Indicate By Their Form or Other Peculiarity Whether the Contents are Intended for Internal or External Use.

We are of the opinion that the questions of dosage and of special containers for dispensing are beyond the scope of the conference.

8. International Regulation of the Traffic in Narcotics.

This is distinctly a police proposition and not medical or pharmaceutical and can be well left to other agencies that have the subject under consideration.

9. Examination of the Project to Create a Permanent International Secretariat of Pharmacopœias.

We approve of the project to establish an international secretariat of pharmacopœias. A definite program should be formulated by the conference, after a study of the requirements and possibilities of the office.

10. Adoption of an International Nomenclature for Pharmacopœias.

We believe that the time has come when there should be outlined specific rules for a "Latin of pharmacy and medicine" to be applied to the titles of the materia medica and adopted in the future revisions of the pharmacopœias of the contributing nations. This Latin must differ in some respects from that of classical Latin because of the number of modern terms and titles for which no classical word seems to be entirely appropriate.

As an illustration of this need, a recent compilation of nineteen of the national pharmacopœias shows twelve different official titles for Fowler's Solution.

It is believed, however, that the Conference should formulate a set of general principles to be followed rather than to concern itself with individual titles. These principles should be sufficiently flexible to permit minor deviations due to the established usage in the different countries and thereby make it possible for all of the pharmacopœial revision committees to adopt them.

In the event that an international system of nomenclature is adopted, it is suggested that Latin be used for the official titles, since it is the language most generally used for this purpose and is subject to little change.

If a single general form for titles cannot be agreed upon, it is recommended that the dual system, adopted by the conference in 1902, and now in use in the International Protocol, be adopted.

In cases where the revision committees of the various pharmacopœias find it impracticable to adopt as the official title a title recommended by the conference, it is suggested that the international title be given as a synonym followed by the abbreviation "P. I."

It is recommended that the name of the cation precede that of the anion in the titles for salts; as is now done in the majority of the pharmacopœias.

It is recommended that the matter of including trade-marked names as synonyms for official items be left to the discretion of the individual committees of revision of the various pharmacopœias, since the use of these names in this manner is prohibited by law in some countries.

ABSTRACTED AND REPRINTED ARTICLES

CHANGES IN THE NEW U. S. PHARMACOPŒIA, TENTH REVISION (U. S. P. X.).*

A word as to the method used in selecting the drugs which are described in the Pharmacopœia may be of interest to the members of the medical profession. The procedure adopted in the Tenth Revision, which differed somewhat from that of earlier editions, was briefly as follows: Each drug and preparation was first carefully considered by the Sub-committee on Scope who reported their findings to the General Committee of Revision. The principle governing the deliberations of the Sub-committee was to admit only those substances for which there was at least a reasonable amount of evidence of therapeutic value—except such agents as are used for pharmaceutical or flavoring purposes. Any objection to the findings of the Sub-committee on Scope were referred to a special committee of all the medical members of the Committee of Revision. The decision of this special committee was final. It was hoped by this method of selection to make the U. S. Pharmacopœia not only a book of legal standards for substances used in the treatment of the sick, but one which reflects the best practice of the American Medical Profession.

LIST OF NEW ADMISSIONS.

Acidum Acetylsalicylicum—Acetylsalicylic Acid.
Synonyms and Brand Names—Aspirin; Empyrin; etc.
Uses—Analgesic, antirheumatic.
Dose—Five grains (0.3 Gm.)

Acidum Acetyltannicum—Acetyltannic Acid.
Synonyms and Brand Names—Acetannin; Diacetyltannic Acid; Tannigen.
Uses—Astringent for diarrhœa.
Dose—Ten grains (0.6 Gm.)

Æthylis Aminobenzoas—Ethyl Aminobenzoate.
Synonyms and Brand Names—Benzocaine; Anesthesin.
Uses—Local Anesthetic (insoluble).
Dose—Five grains (0.3 Gm.) for gastric ulcer.

*Compiled by Horatio C. Wood, Jr., M. D., for Distribution at the Educational Exhibition of Drugs and Preparations of the new U. S. Pharmacopœia, Tenth Revision held at the annual meeting of the American Medical Association, Atlantic City, N. J., May 25 to 29, 1925, under the auspices of The Philadelphia Branch of the American Pharmaceutical Association.

Æthylis Chaulmoogras—Ethyl Chaulmoograte.
Synonyms and Brand Names—Chaulmoogra Oil Esters; Chaulmestrol.
Uses—Leprosy.
Dose—Fifteen minims (1 cc.)

Albumini Tannas—Albumin Tannate.
Synonyms and Brand Names—Albutannin; Tannalbin.
Uses—Astringent for diarrhœa.
Dose—Thirty grains (2 Gm.)

Amidopyrina—Amidopyrine.
Synonyms and Brand Names—Pyramidon.
Uses—Analgesic and Antipyretic.
Dose—Five grains (0.3 Gm.)

Argento-Proteinum Fortius—Strong Silver-Protein.
Synonyms and Brand Names—Protargin Strong; Protargol; Proganol; Protargentum; etc.
Uses—Antiseptic. Although containing less silver it is a more active germicide, and more irritant locally, than the following.

Argento-Proteinum Mite—Mild Silver-Protein.
Synonyms and Brand Names—Protargin Mild; Argyrol; Argyn; Cargentos; Silvol; Solargentum; etc.
Uses—Antiseptic. Less irritant but less potent than Arg.-Prot. Fort.
Dose—Used locally.

Arsphenamina—Arsphenamine.
Synonyms and Brand Names—Arsenobenzol; Diarsenol; Salvarsan; 606; etc.
Uses—Antisyphilitic.
Dose—Six grains (0.4 Gm.)

Barbitalum—Barbital.
Synonyms and Brand Names—Diethylbarbituric Acid; Veronal.
Uses—Somnifacient.
Dose—Eight grains (0.5 Gm.)

Barbitalum Solubile—Soluble Barbital.
Synonyms and Brand Names—Sodium Diethylbarbiturate; Veronal-sodium, Barbital Sodium; Medinal.
Uses—Somnifacient.
Dose—Eight grains (0.5 Gm.)

Barii Sulphas—Barium Sulphate.
Never abbreviate this title!
Uses—For making X-ray pictures of alimentary canal.

Calcii Iodobehenas—Calcium Iodobehenate.
Synonyms and Brand Names—Calioben; Sajodin.
Uses—Same as potassium iodide.
Dose—Eight grains (0.5 Gm.)

Carbonei Tetrachloridum—Carbon Tetrachloride.
Synonym—Tetrachlormethane.
Uses—Anthelmintic.
Dose—Forty minims (2.5 cc.). Not to be repeated within three weeks.

Carbromalum—Carbromal.
Synonym and Brand Name—Adalin.
Uses—Nerve sedative, anodyne, and hypnotic.
Dose—Eight grains (0.5 Gm.).

Chloramina—Chloramine.
Synonyms and Brand Names—Chloramine-T., Chlorazene.
Uses—Surgical disinfectant—Its aqueous solution is not identical with Dakin's Solution.
Dose—Used locally.

Dextrosum—Dextrose.
Synonyms—Crystallized Glucose; Saccharum Amylaceum.
Uses—For intravenous injection in shock, hemorrhage, acidosis, etc.

Dichloramina—Dichloramine.
Synonym and Brand Name—Dichloramine-T.
Uses—Surgical disinfectant.
Dose—Used locally.

Epinephrina—Epinephrine.
Synonyms and Brand Names—Adrenalin; Suprarenalin; etc.
Uses—Asthma. Local vaso-constrictor.
Dose—1/120 grain (0.0005 Gm.).

Fluidextractum Belladonnæ Foliorum—Fluidextract of Belladonna Leaves.
Uses—Same as Belladonna.
Dose—One minim (0.06 cc.).

Fluidextractum Rhois Glabræ—Fluidextract of Rhus Glabra.
Synonym—Fluidextract of Sumac Berries.
Uses—Astringent for diarrhœa and sore throat.
Dose—Fifteen minims (1 cc.).

Ipomœa—Ipomea.
Synonyms and Brand Names—Male Jalap; Orizaba Jalap; Mexican Scammony.
Uses—Purgative.
Used only for making Resin of Ipomea.

Krameria—Krameria.
Synonym—Rhatany.
Uses—Astringent.
Dose—Fifteen grains (1 Gm.).

Liquor Epinephrinæ Hydrochloridi—Solution of Epinephrine Hydrochloride.
Synonyms and Brand Names—Adrenalin Solution; Suprarenalin Solution; etc.
Uses—Local vaso-contrictor.
Dose—Eight minims (0.5 cc.).

Liquor Sodæ Chlorinatæ Chirurgicalis—Surgical Solution of Chlorinated Soda.
Synonyms and Brand Names—Dakin's Solution; Sodium Hypochlorite Solution.
Uses—Surgical disinfectant.
Dose—Used locally.

Neoarsphenamina—Neoarsphenamine.
Synonyms and Brand Names—Novarsenobenzol; Neosalvarsan; etc.
Uses—Antisyphilitic.
Dose—Nine grains (0.6 Gm.)

Oleum Chaulmoograe—Chaulmoogra Oil.
Uses—Leprosy.
Dose—Fifteen minims (1 cc.).

Paraffinum Chlorinatum—Chlorinated Paraffin.
Synonym and Brand Name—Chlorcosane.
Uses—For making Dichloramine Solutions.

Phenobarbitalum—Phenobarbital.
Synonym and Brand Name—Luminal.
Uses—In epilepsy and as somnifacient.
Dose—One-half grain (0.03 Gm.).

Phenolsulphonphthaleinum—Phenolsulphonphthalein.
Synonym—Phenol Red.
Uses—Test for kidney function.
Dose—One-tenth grain (0.006 Gm.).

Procainæ Hydrochloridum—Procaine Hydrochloride.
Synonym and Brand Name—Novocaine.
Uses—Local Anesthetic.

Quinidinæ Sulphas—Quinidine Sulphate.
Uses—In auricular fibrillation.
Dose—Five grains (0.3 Gm.) Caution!

Quininæ Aethylcarbonas—Quinine Ethylcarbonate.
Synonym and Brand Name—Euquinine.
Uses—Tasteless form of quinine.

Dose—Tonic, one and a half grains (0.1 Gm.);
antimalarial, fifteen grains (1 Gm.).

Resina Ipomœæ—Resin of Ipomea.
Synonym—Resin of Mexican Scammony.
Uses—Purgative—Replaces Scammony Resin.
Dose—Three grains (0.2 Gm.).

Rhus Glabra—Rhus Glabra.
Synonym—Sumac Berries.
Uses—Astringent.
Dose—Fifteen grains (1 Gm.).

Sodii Biphosphas—Sodium Biphosphate.
Synonyms—Acid Phosphate of Sodium; Sodium Acid Phosphate; Monobasic Sodium Phosphate.
Uses—To increase acidity of urine.
Dose—Ten grains (0.6 Gm.).

Spiritus Frumenti—Whisky.

Spiritus Vini Vitis—Brandy.
Synonyms—Spiritus Vini Gallici—Cognac.

Thyroxinum—Thyroxin.
Active principle of Thyroid Gland.
Uses—Same as Thyroid.
Dose—One hundred and twentieth grain (0.0005 Gm.).

Tinctura Krameriæ—Tincture of Krameria.
Synonym—Tincture of Rhatany.
Uses—Astringent.
Dose—One fluidrachm (4 cc.).

NEW NAMES.

In the past, objection has been made to some of the Pharmacopœial names, especially those of synthetic drugs, because of their undue length. The present Committee of Revision has made an effort to overcome this obstacle to the more universal use of official names by the introduction of coined words. Some of the substances described are familiar to the medical profession under trade names; these names, however, cannot be used in an official book because they are the trade-mark property of certain manufacturers.

There are several reasons why physicians should employ official names, even when these are more cumbersome and less familiar. The most important of these reasons is the protection which the use of official terms affords both the doctor and the patient. When a drug is prescribed by a brand or trade-marked name, there is no assurance of quality of the proprietary form of the drug which must be dispensed, except the commercial honesty of the manufacturer.

Instances are not lacking where makers of proprietary medicines have altered materially the composition of their remedy without notification to the medical profession. On the other hand, when a drug is sold under an official name, the Federal Food and Drugs Act, as well as the laws of many states, requires that the drug must conform to the standards set forth in the Pharmacopœia. The law spreads its aegis of protection over Pharmacopœial names but not over trade-marked names.

In the list of changes given below, attention may be called especially to the ointments of mercury. Formerly the 50 per cent. ointment of mercury, employed as a means of systemic administration of this drug by inunction, was known as Unguentum Hydrargyri and a 33 per cent. ointment, intended to be used as a local remedy in parasitic conditions of the skin, was known as Unguentum Hydrargyri Dilutum. In order to bring the U. S. Pharmacopœia into harmony with the International Protocol, the name of this latter has been changed to **Unguentum Hydrargyri Mite,** while the form intended for absorption is called **Unguentum Hydrargyri Fortius.** The new ointment of mercury, therefore, is made with a base not intended for easy absorption through the skin, but for its immediate local action, and where the physician desires the constitutional action of mercury he should prescribe **Ung. Hydrarg. Fort.**

Only one preparation has been seriously altered in strength. The Ointment of Yellow Mercuric Oxide (Unguentum Hydrargyri Oxidi Flavi) has been reduced from 10 per cent. to 1 per cent. in conformity with the customary practice of today.

CHANGES IN TITLES.

Old Titles U. S. P. IX	New Titles U. S. P. X.	Popular and English Names
Acidum Phenylcinchoninicum	Cinchophenum	Atophan
Aqua Aurantii Florum Fortior	Aqua Aurantii Florum	Orange Flower Water
Balsamum Tolutanum	Tolu	Tolu
Benzosulphinidum	Glusidum	Saccharin
Betaeucainæ Hydrochloridum	Eucainæ Hydrochloridum	Eucaine
Chloralum Hydratum	Chloralum Hydras	Chloral Hydrate
Cinchona Rubra	Cinchona	Cinchona Bark
Cinnamomum Saigonicum	Cinnamonum	Cinnamon
Cotarninæ Hydrochloridum	Cotarninæ Chloridum	Sypticin
Emplastrum Elasticum	Emplastrum Adhæsivum	Adhesive Plaster; Sticking Plaster
Emplastrum Plumbi	Emplastrum Plumbi Oleatis	Diachylon Plaster; Lead Plaster
Extractum Belladonnæ Foliorum	Extractum Belladonnæ	Extract of Belladonna
Extractum Colchici Cormi	Extractum Colchici	Extract of Colchicum

CHANGES IN TITLES—Continued.

Old Titles U. S. P. IX	New Titles U. S. P. X.	Popular and English Names
Ferri Phosphas	Ferri Phosphas Solubilis	Iron Phosphate
Fluidextractum Colchici Seminis	Fluidextractum Colchici	Fluidextract of Colchicum
Hexamethylenamina	Methenamina	Formin, Urotropin, etc.
Hypophysis Sicca	Pituitarium	Pituitary
Liquor Calcis	Liquor Calcii Hydroxidi	Lime Water
Liquor Hypophysis	Liquor Pituitarii	Pituitary Solution
Mel Depuratum	Mel	Honey
Oleum Cassiæ	Oleum Cinnamonum	Oil of Cinnamon
Oleum Picis Liquidæ Rectificatum	Oleum Picis Rectificatum	Oil of Tar
Pilulæ Catharticæ Compositae	Pilulæ Hydrargyri Chloridi Mitis Compositæ	Compound Cathartic Pills
Pix Liquida	Pix Pini	Tar; Pine Tar
Plumbi Oxidum	Plumbi Monoxidum	Lead Oxide; Lead Monoxide; Yellow Oxide of Lead
Rosa Gallica	Rosa	Rose Leaves
Saccharum	Sucrosum	Cane Sugar
Saccharum Lactis	Lactosum	Milk Sugar
Serum Antidiphthericum Purificatum	Antitoxinum Diphthericum	Diphtheria Antitoxin
Serum Antitetanicum	Antitoxinum Tetanicum Crudum	Crude Tetanus Antitoxin
Serum Antitetanicum Purificatum	Antitoxinum Tetanicum	Tetanus Antitoxinum
Sodii Benzosulphinidum	Glusidum Solubile	Soluble Saccharin
Spiritus Ætheris Nitrosi	Spiritus Æthylis Nitritis	Sweet Spirit of Nitre
Syrupus Picis Liquidæ	Syrupus Picis Pini	Syrup of Tar
Syrupus Tolutanus	Syrupus Tolu	Syrup of Tolu
Thyroideum Siccum	Thyroideum	Thyroid
Tinctura Belladonnæ Foliorum	Tinctura Belladonnæ	Tincture of Belladonna
Tinctura Colchici Seminis	Tinctura Colchici	Tincture of Colchicum
Tinctura Limonis Corticis	Tinctura Limonis	Tincture of Lemon Peel
Tinctura Opii Deodorati	Tinctura Opii	Tincture of Opium Tincture of Deodorized Opium
Tinctura Tolutana	Tinctura Tolu	Tincture of Tolu
Unguentum Diachylon	Unguentum Plumbi Oleatis	Diachylon Ointment
Unguentum Hydrargyri	Unguentum Hydrargyri Fortius	Stronger Mercurial Ointment
Unguentum Hydrargyri Dilutum	Unguentum Hydrargyri Mite	Mild Mercurial Ointment; Blue Ointment
Unguentum Picis Liquidae	Unguentum Picis Pini	Tar Ointment
Virus Vaccinicum	Vaccinum Variolæ	Vaccine Virus; Smallpox Vaccine

THE TWILIGHT ZONE OF MATTER.*[1]

By Alexander Findlay.

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When we crush and grind the ordinary coarse matter which we can see and handle, we can break it up into smaller and smaller particles. At first these particles can still be seen by the unaided eye, but as the process of grinding is continued they become so small that they can be distinguished only with the help of a lens or microscope. One can carry the process of subdivision of matter still further, so that the particles become too small to be seen even with the aid of the most powerful microscope; and finally reaches the ultimate limit of subdivision, the molecule, beyond which further subdivision is impossible without destroying the chemical nature of the substance. Since the smallest particle of matter directly visible under the microscope is perhaps about a thousand times larger than the simplest molecule, a considerable range of subdivision of matter lies between the limits of the microscopically visible and the molecular states; and it is to this intermediate zone that I have ventured to apply the term "the twilight zone of matter." It is to this range of subdivision of matter that, in more scientific language, the term "colloidal state" of matter is applied.

Not only does matter in the twilight zone of subdivision present many problems of peculiar fascination to the seeker after a fuller knowledge of natural phenomena, but the important role which colloidal matter plays in almost all the diverse fields of human activity appeals also to the man of more practical instincts. In agricultural and in the tanning of leather, in the working of clay for the manufacture of the common brick or for the production of the finest porcelain, in the production of artificial silk and of smokeless ammunition, in the dyeing of textile fibers and in the production of the blue of the sky or the blue of the eye, the colloidal state of matter plays a part. When, further, we recall that Nature has selected matter in the colloidal state to be the vehicle of life and as the medium in which all life processes take place, the importance and interest of a study of the twilight zone of matter become obvious.

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[1] Presented before the Seventieth Meeting of the American Chemical Society, Los Angeles, Cal., August 3 to 8, 1925.

Evidence for Existence of Colloidal Particles.

It was the Scottish chemist Graham who first discovered a useful method of distinguishing between the molecular state of subdivision and the state of subdivision known as colloidal. Certain substances in solution were found to diffuse through parchment paper or animal membrane, whereas other substances could not do so; and since the substances that did not diffuse through parchment paper were thought to be noncrystallizable and of the nature of gelatin, glue, and similar materials, Graham called them "colloids," from the Greek word for glue. Substances that diffused through parchment paper and existed in solution in the molecular state of subdivision—and salt, for example—were called crystalloids.

Although we recognize the imperfections of Graham's classification, his distinction is of considerable practical importance, for the process of dialysis, discovered by him, gave a means of distinguishing between molecularly dispersed matter and matter in the so-called colloidal state.

Since the characteristic properties of the twilight zone of matter do not depend on the physical state of the finely subdivided matter or of the medium in which the matter is dispersed, we shall find the colloidal properties exhibited not only by colloidal suspensions or emulsions, where we have solid particles or liquid droplets dispersed in a liquid medium, but by smokes (solid particles in a gaseous medium), mists (liquid droplets in a gaseous medium), foams (gas bubbles in a liquid), and so on.

Whereas it could be inferred from the experiments of Graham that the colloidal systems, although apparently homogeneous like a solution of sugar, are nevertheless heterogeneous and contain particles which have a magnitude greater than molecular, the actual existence of such particles has been rendered evident by the scattering of light by these particles and the so-called Tyndall effect—and the introduction of the ultramicroscope by Siendentopff and Zsigmondy has enabled the eye to detect the presence of particles of a magnitude of about 0.000006 mm., which is about sixty times the dimensions of a hydrogen molecule. By the use of ultra-violet light and a photographic plate instead of the eye, particles of still smaller dimensions can be detected. This fact has proved of great value in biochemistry in the examination of filterable viruses, as in the case of the virus of cancer according to recent announcements from London.

In the scattering of light by finely divided particles, it is mainly the light of shorter wave length that is scattered and the light reaching the eye is therefore blue. The very fine smoke rising from a wood fire, for example, when illuminated from the side and viewed against a dark background, appears blue, but when viewed against a background of white cloud—that is, by transmitted light—the smoke appears reddish brown in color. In the same way, as Leonardo da Vinci suggested long ago, one may explain the blueness of the sky by the scattering of the sunlight by finely dispersed particles in the atmosphere—or, as is now thought, by the molecules of the atmospheric gases themselves—the background being the blackness of infinite space. The blue color of the eye and the blue color of feathers are similarly to be explained, as Bancroft has so fully shown, by the scattering of light by finely dispersed matter.

Absorption in Production of Colloids.

Matter in the colloidal state is therefore matter in a very fine state of subdivision, so that the extent of surface exposed is very large compared with the total volume of the matter. Surface forces, therefore, play an predominant part and bring about changes in the distribution or concentration of matter at the surface of the particles. This change of concentration at a surface, brought about by surface forces, is spoken of as adsorption. We see the effect of adsorption, for example, in the removal of coloring matter from solution by charcoal. By reason of its high adsorbing power charcoal was employed during the Great War in the construction of gas masks for the adsorption of so-called poison gases, many of which were not gases at all, but finely subdivided solids—colloidal smokes. Similarly, the recently introduced, highly porous silica gel is used for the recovery of volatile solvents, for the removal, by preferential adsorption, of gasoline from natural gas, and for freeing crude petroleum from deleterious sulfur compounds.

In the production and characterization of colloidal systems, adsorption plays a very important part. By the adsorption of ions from the dispersion medium or from electrolytes present in the solution, the colloid particles acquire an electric charge; and adsorption of the dispersion medium as a whole may also take place to a greater or less extent whereby variation in the general behavior of colloids may be produced. In the case of the so-called suspensoid colloids or hydro-

phobe colloids, such as colloidal solutions of gold or arsenious sulfide, the dispersed particles may adsorb none or practically none of the dispersion medium, and they therefore exist in suspension as non-hydrated particles, the stability of which is due to their elective charge and to their Brownian movement. In the case of the so-called emulsoid or hydrophile colloids, such as solutions of gelatin or starch, the dispersion medium itself is adsorbed and the stability and properties of such a colloidal solution are due to this adsorbed water as well as to the electric charge on the particles. The greater the adsorption of the dispersion medium, the more will the stability and properties of the colloidal solution be dependent on this adsorbed medium and the less will they depend on the electric charge.

If the electric charge on a suspensoid colloid is neutralized, agglomeration of the particles followed by precipitation takes place, and this neutralization can readily be effected by the addition of electrolyte. Negatively charged colloid particles will preferentially adsorb the positive ions of the added electrolyte, and positively charged colloids the negative ions, thus neutralizing the charge on the colloid. Although multivalent ions are, in general, according to Hardy's rule, more effective in producing precipitation than univalent ions, recent investigation shows that there is no exact relationship between valency and precipitating power, and that the adsorbability of the ion may exercise an important influence. In the precipitation of colloidal sulfur, for example, cesium ion is a hundred times more effective than the lithium ion and has a greater percipitating power than the bivalent ions of zinc, cadmium, or nickel.

The precipitation of fine particles by electrolytes is well illustrated in nature, where the finely divided clay carried by many rivers is deposited when the river water mingles with the sea, thus silting up river mouths and forming deltas.

The electrical charge on a colloid particle may be neutralized not only by the ion of an electrolyte, but also by another colloid carrying an electric charge of opposite sign. Colloids of opposite sign may mutually precipitate each other and produce adsorption complexes, as Bancroft has called them, which simulate chemical compounds. Purple of Cassius, for example, is an adsorption complex of stannic oxide and colloidal gold.

Although mutual precipitation may take place essentially as a result of adsorption, chemical reaction may later occur. As Bayliss has shown, when alumina absorbs free Congo red acid, which is blue

in color, a blue precipitate is formed, but when this precipitate is suspended in water, the blue color changes to red, which is the color of the salts of Congo red.

Adsorption plays an important part in the dyeing of textiles and the staining of animal tissues. Here the negatively charged color ion of the acid dyes is predominantly adsorbed by a positively charged fiber, and a positively charged dye (basic dye) by a negatively charged fiber. In an acid, both the positive charge on the fibers is increased by adsorption of hydrogen ions and adsorption of a negative or acid dye by the fiber is increased. On the other hand, in alkaline solution the negative charge on the fiber is increased and adsorption of a positive or basic dye by the fiber is facilitated. Similarly, addition of a salt giving a readily absorbed ion—*e. g.*, sulfate ion—will both increase the adsorption of a basic dye and diminish that of an acid dye. In the case of substantive dyes the dye itself is in colloidal solution, and addition of electrolyte in small amount increases the dye absorption by diminishing the stability of the colloid. Where mordants are used, adsorption takes place, the mordant, a colloid, adsorbing the dye from the dye bath and fixing it on the fiber. It is really the mordant that is dyed, not the fiber. After the dye has been adsorbed secondary changes may take place, leading to the formation of a more stable adsorption complex.

In the case of colloidal solutions of the gelatin type, the stability of the colloid is due mainly to absorbed water or adsorbed dispersion medium, and consequently such solutions are not so sensitive to added electrolytes. Although the addition of small amounts of an electrolyte may produce changes in the amount of water adsorbed by the colloid, actual precipitation does not take place until the concentration of added electrolyte is relatively large.

The comparatively great insensitiveness to electrolytes shown by hydrophile colloids of the gelatin type may be transferred to hydrophobic or supensoid colloids of the colloidal gold type. When gelatin, for example, is added to a colloidal gold solution, the gold is adsorbed by the gelatin and a much greater concentration of electrolyte is required in order to precipitate the gold than is necessary in the absence of the gelatin. The gelatin is said to protect the gold. This so-called protective action, which varies greatly in different hydrophile colloids, is of much importance in many directions. In the Mississippi and Nile rivers the water is always turbid and muddy, owing to the presence of a large amount of colloidal organic matter which stabilizes

the fine suspension of clay and soil; and it is only when the rivers reach the salt water of the sea, with its high concentration of salts, that the finely dispersed mud is precipitated, forming deltas. The water of the Ohio river on the other hand, is at all times clear, owing to the absence of protective colloid and the presence of lime and other salts which act as precipitating agents.

Protective Action.

By the use of protective colloids, sparingly soluble substances produced by chemical reaction can be kept in a colloidal state and so prevented from undergoing flocculation and sedimentation. In the production of the photographic plate the silver bromide is prevented from forming a precipitate of coarse particles unsuitable for photographic purposes, and is kept by the protective action of gelatin in a finely divided form.

In many physiological processes, the protective action of hydrophile colloids may also play an important part. In normal bile the bile salts, albuminoids, etc., act as protective colloids which keep the sparingly soluble substances, such as cholesterol and the calcium salt of bilirubin, in the colloidal state and so prevent their deposition, but when the amount of protective colloids is reduced by pathological conditions, deposition of the sparingly soluble substances as gallstones takes place.

The nature of the curd that separates from milk and the readiness with which it is formed are greatly affected by the presence of protective colloids. Cow's milk contains a large amount of casein and a small amount of the protective colloid, lactalbumin; it therefore curdles readily. In human milk there is a smaller proportion of casein and a larger proportion of lactalbumin, so that the casein is more effectively protected and curdling takes place less readily. In ass's milk the relative proportion of protective colloid is highest of all and curdling takes place with greatest difficulty. The digestibility of ass's milk is consequently greatest. By increasing the amount of protective colloid in cow's milk by addition of gelatin or white of egg, or even of barley water (starch), curdling occurs less readily and the digestibility of the milk is increased. The smoothness of a good ice cream is due to protective colloids, such as gelatin or white of egg, which prevent the coagulation of the casein and keep the crystals of ice extremely small.

Many colloids of the hydrophile type—*e. g.*, gelatin, fibrin, etc. —when cooled pass into a jelly, owing to a coalescence of the hydrated colloid particles. This jelly may be dried and is then obtained as a more or less horn-like material, such as ordinary dry gelatin. These jellies have the important property of imbibing water, even against very great pressures. This imbibing power is of great biological and agricultural importance. The amount of water imbibed is greatly affected by the presence of electrolytes, being increased by acids and alkalies, up to a certain concentration, but the increased swelling producd by dilute acids is diminished by the addition of salts.

Colloids in Life Processes.

The protoplasm of the cells, as has been demonstrated by Gaidukov and by Price, consists of a mixture of colloids. In the cell we have a complex emulsion which under the changing conditions of life may vary in consistency from that of a colloidal solution to that of a colloidal gel or jelly. In this system there occur processes of adsorption, changes in dispersity, and alterations of the distribution of water between the colloidal particles and the dispersion medium. The living protoplasm, indeed, is a complex system of colloids between which the mutual relations are in a constant state of flux under the action of electrolytes and of stimuli of different kinds, and in which the mass law relationships are altered, now in this direction, now in that, enabling the processes of decomposition and of synthesis to take place. Only in such a colloid system is it possible to have the flexibility and adaptability to the varying requirements of what we call life and growth. Just as gelatin, fibrin, and other colloids can imbibe and hold large quantities of water, so it is possible for the living organism, aided no doubt by osmotic forces and the presence of membranes of a semipermeable character, to hold the 80 per cent. of water present in the body tissues and to preserve the turgor necessary for healthy life. Moreover, the many diverse chemical reactions involved in the breaking down of complex foodstuffs into simple substances and the building up again of these simple compounds into the complex proteins of the protoplasm are accomplished in the living body under the catalytic activity of the enzymes, and these are themselves colloids.

The living organism, therefore, is a vast colloidal community, the diverse members of which are held together in common service

by surface forces and by the mutual actions and reactions of electrical changes, and in this community the colloidal workers are engaged in carrying out the multifarious and complex chemical operations on which the life and the health of the community depend.

Martin Fischer has emphasized, perhaps over-emphasized, the analogy between the inhibition of water by gelatin and the water-absorbing and -retaining power of the colloids of the living organism as affected by variations in the concentration of electrolytes and especially of acids. That work is of great interest and importance, but I wish here to refer more especially to the work of Bancroft and of Clowes on emulsions as affording a suggestive explanation of the action of the plasmatic membrane of cells.

One of the most interesting phenomena in connection with the action of electrolytes on living cells is the so-called antagonistic action of ions. The beat of a heart, for example, continuously perfused with a solution of sodium chloride, isotonic with the blood, soon ceases, but the "toxic" action of the sodium ions can be counteracted by the addition of a small amount of a calcium salt. Similarly, as Loeb showed, the marine organism *Fundulus* dies when placed in a solution of sodium chloride of the same osmotic pressure as sea water, and it dies also in a solution of calcium chloride. In a mixed solution of these two salts, however, containing the salts in the ratio of about fifty molecules of sodium chloride to one molecule of calcium chloride, the organism continues to live. Since, as Straub has shown the effect of electrolytes in an effect on the cell membrane, it is to the latter effect that we may turn our attention.

The protoplasm of the living cell is surrounded by a membrane or surface layer which allows the passage of certain dissolved substances but prevents the passage of others. Although in some respects this plasmatic membrane is similar to artificial semipermeable membranes like copper ferro cyanide, experiment shows that very important differences exist. The membrane of the living cell, as Nägeli has shown, is self-forming, and it differs also from the inorganic semipermeable membranes in that its permeability may vary and that it is adaptable to the varying requirements of an ever-changing life process. While the cell is resting, for example, the plasmatic membrane is impermeable to glucose and the amino acids, but when the cell passes into a state of functional activity these substances can pass through the membrane.

The permeability of the plasmatic membrane is also variously affected by differentions. A frog's muscle, for example, placed in an isotonic solution of potassium chloride, is permeable to potassium ions. When, however, sodium and calcium salts, which are normally present in blood plasma, are added, the normal impermeability of the muscle cells to potassium is regained. Although the resting muscle cell is impermeable to potassium salts, the active muscle cell is permeable.

The plasmatic or cell membrane, is a surface film or layer comparable with the layer of increased concentration which forms at the boundary surface of a solution when the surface tension of the solvent is lowered by the solute—*e. g.*, solutions of peptone. The materials forming the plasmatic membrane must be drawn, therefore, from the constituents of the cell, more especially lipoids. Various views have been put forward to explain the selective permeability of the cell membrane. In view of the variability of the cell membrane under different conditions, and more especially of the antagonistic action of ions on the permeability, much interest attaches to the work and suggestions of Bancroft and of Clowes.

When water and olive oil, for example, are shaken vigorously together, the oil is broken up into drops. These drops are comparatively large and no permanent emulsion is formed. In order that the droplets of oil may become sufficiently finely divided and a permanent colloidal emulsion obtained, an emulsifying agent must be added to break up the drops and prevent them from coalescing.

Bancroft has shown that a water solution of a sodium soap has a lower surface tension than when the soap is dissolved in oil, and that when a mixture of oil and aqueous soap solution is shaken an emulsion of oil in water is formed. On the other hand, the surface tension of a solution of a calcium soap in water is greater than in oil, and therefore an emulsion of water in oil is formed. In the first case the water is the continuous phase, while in the second the oil is the continuous phase. The reversal of an oil-in-water emulsion to a water-in-oil emulsion can be effected by different salts. Alkali salts, for example, favor the formation of oil-in-water emulsions, whereas calcium salts favor the formation of water-in-oil emulsions. Here again we have the same antagonistic action of ions as in the case of heart muscle. Similarly, blood plasma may be regarded as an emulsion of fibrinogen and other colloids in an aqueous medium, and the blood clot an emulsion of water in fibrin. The production of the

latter system is favored by calcium salts, but is retarded by sodium salts.

Clowes has shown that there is a very close resemblance between the effects produced in emulsions of oil and water and those produced in biological systems, and he has made the valuable suggestion that the cell membrane is a system, a colloidal emulsion, of two phases—a watery solution of protein and a lipoid phase. In the resting state of the cell the membrane consists of an emulsion of protein solution in lipoid, the latter being the continuous phase. In this state, therefore, the membrane will be permeable only to the substances that are lipoid-soluble. In the active state of the cell there is a reversal of the emulsion, and the aqueous phase becomes the continuous one. In this case substances soluble in water will now be able to pass through. In each instance, however, regarding the emulsion membrane as a sieve, the membrane will be permeable only to those substances the particles or molecules of which are small enough to pass through the "pores" between the droplets of the dispersed phase.

We can thus regard not only the protoplasmic cell contents but also the surface layer or cell membrane as a colloid system, and by adopting the view, probably not complete in itself, that the cell membrane is a complex emulsion of colloids, the two phases of which are capable of undergoing reversal, we can explain many of the phenomena associated with the action of the cell membrane.

Conclusion.

Although we must recognize the essential importance of colloidal matter in connection with the phenomena of life, and matter in the colloidal state is the vehicle of life; although, further, we may interpret much of the behavior of living matter in terms of physics and chemistry, I am of the opinion that we cannot explain life itself in terms of physical science. There seems to be no continuity between inanimate colloidal matter and living matter, but there is a distinct and sharp break in the curve of relations. In other words, life is a new factor, a new set of potentialities, introduced into inanimate matter. Life is a new creation.

THE RUPP METHOD FOR THE DETECTION OF CHLORINE IN MILK.*†

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Probably no food product is more susceptible to spoilage through bacterial activities than milk. Given the proper temperature, milk will deteriorate despite the most scrupulous care that the producer may exercise in the matter of cleanliness. Bottlers of milk have long realized this and, accordingly, the more exacting are using all possible means to protect their milk supply from bacterial contamination. One of the greatest aids toward this end is the thorough sterilization of the containers and utensils with which the milk comes in contact.

Of the many agents which might serve for this purpose, apparently the hypochlorites and chloramines are most favored by dairymen. Several articles dealing with the use of chlorine compounds for sterilizing dairy utensils have appeared in the literature. G. B. Taylor [1] discusses the action of calcium hypochlorite as a suitable means for sterilizing dairy utensils. This author lays particular stress upon the necessity for cleanliness in order that the hypochlorite may have the desired action, and cautions against the unrestricted use of sterilizing solutions. Hale and Bleecker [2] discuss the use of sodium hypochlorite as a germicide for milk and milk products. They state, "Chlorin water gives as satisfactory results in forty-five minutes as sodium hypochlorite does in ninety minutes or calcium hypochlorite in nineteen hours. . . . It is not the wish of the authors that this paper be considered in any way as a recommendation of chlorin for treating market milk."

Leech [3] points out that hypochlorites and chloramines have a common characteristic, *i. e.*, a positively charged chlorine atom, which is relatively unstable and has a tendency to go over into the more stable negative atom. Hence, both of the compounds are active oxydizing agents and it is to this property that Leech attributes their antiseptic and germicidal action.

Of the chloramines, "Chloramine T" is the most commonly used for general disinfecting purposes. This compound, identified chemically as sodium paratoluene sulfochloramide, has disinfecting

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properties similar to those of sodium hypochlorite. It has, however, the added advantage of greater stability. "Chloramine T" is a white crystalline powder containing from 12 to 13 per cent. available chlorine and is freely soluble in water.

It would seem, because of the active chlorine contained in chloramines and hypochlorites, that there should be no difficulty in detecting the presence of small quantities of these substances when added to milk. However, it is apparent that the test for identifying the minute quantities which might remain in a milk through the washing of utensils with a solution of one or the other of these substances would have to be extremely sensitive.

Rupp, of the Bureau of Dairying of the United States Department of Agriculture, has investigated the question of the detection of chloramines and hypochlorites in milk and cream.[4] He says, "Very small quantities of chlorin in water solution can easily be detected, either by means of the iodid-starch or the o-toluidin test. However, when applied to milk containing small amounts of chlorin, these tests are of no value because the chlorin has combined with the protein of the milk and is not liberated readily at room temperature by the addition of acid."

Recognizing the disturbing influence which the protein content of milk has upon the liberation of chlorine, Rupp conducted experiments for the purpose of establishing the most satisfactory conditions for the elimination of this trouble. He finally adopted the procedure in which heat is applied to the acidified milk to break up the protein-chlorine combination. The chlorine having been thus liberated is then permitted to react with potassium iodide to form free iodine, which is finally identified by the blue color produced with starch. The author of the test concludes: "One part of chlorin in 50,000 parts of milk or cream can be detected by this method."

Rupp directed his efforts to the detection of *added* chlorine in milk. As Zoeller [5] has shown, the presence of free chlorine in a milk may be readily recognized by the blue color which the starch-iodide reagent produces when applied directly without acidifying the sample. This author states that a trace of sodium hypochlorite added to milk fails to give a color with starch-iodide and that a large quantity gives a blue color. The following statements by this author are given verbatim: "Now if we add some strong acid (HCl) to the milk containing a trace of sodium hypochlorite, we will get a bluish violet coloration with the starch-iodide. It is evident that in this latter

case we have the product or products of the chlorinaion furnishing sufficient of some oxidizing substance in the presence of the strong acid to cause the liberation of a trace of iodine. But it would be an error to interpret this as coming directly from sodium hypochlorite." In other words, Zoeller believes that a blue color obtained by starch-iodide when milk is acidified and heated is not necessarily due to chlorine. However that may be, it cannot be disputed that a reaction with starch-iodide indicates the presence of chlorine or products directly traceable to the use of chlorine. Although the choice of title for Rupp's paper may be unfortunate, inasmuch as the iodine liberated is not necessarily due to chlorine, the method for detecting the use of chlorine in milk has not, to my knowledge, been questioned.

It has come to the attention of the Bureau of Chemistry that in using the Rupp test, copper in milk gives a reaction similar to that of hypochlorites and chloramines. It is well known that copper will liberate iodine from a potassium idodide solution: $2\ Cu + 4I = Cu_2I_2 + I_2$. It is also known that fresh milk normally contains small quantities of copper. Furthermore, it is possible that the quantity of copper may be increased to the point where enough copper is dissolved through contact with this metal in the course of the bottling process to give the Rupp test. Therefore, it would not be safe to assume that a milk which reacts to the Rupp test contains added chlorine.

In order to determine to what extent copper interferes with the reliability of the Rupp test, experiments were made with fresh milk and milk to which copper had been added.

For the determination of small quantities of copper, the "potassium ethyl xanthate" method described by Scott and Derby [6] was used. This method is based upon the yellow color which the xanthate reagent produces with copper, the intensity of which is matched against copper solutions of known strength. Table I gives results obtained:

TABLE I.

Sample	*Description of Sample*	*Copper (Cu) (mgs. per liter)*
1	Fresh milk free from copper contamination	0.75
2	Fresh milk free from copper contamination	0.65
3	Bottled market milk	0.60
4	Bottled market milk	0.40

Samples 1 and 2 are known not to have come in contact with copper during the handling of milk, showing that fresh milk contains a little copper as a normal constituent. These results agree very well with those found by Supplee and Bellis,[7] who report from 0.2 to 0.8 mg. of copper per liter (average 0.52) for twenty-three samples of fresh cow's milk. Expressing the average obtained by these observers in a ratio of dilution, one part of copper is contained in 2,000,000 parts of milk.

Samples 3 and 4 represent ordinary bottled milks sold in the market. From the low copper content as compared with that of fresh milk, it may be assumed that these milks could not have been in contact with copper long enough or the acidity of the milk sufficiently high to effect a solution of copper.

For the purpose of obtaining information regarding the disturbing influence which copper exerts on the Rupp procedure, a number of tests were made with milks containing varying quantities of added copper. A series of samples were prepared by adding known quantities of copper in the form of copper sulphate to fresh milk, namely, 1 part of copper to 100,000 parts of milk, 1 to 66,000, 1 to 50,000, 1 to 40,000, and 1 to 33,000. All of these dilutions upon heating gave a slightly yellowish serum of somewhat varying intensities. On cooling and adding starch solution a blue color was produced in all cases. It was noted, however, that sometimes the solution containing the smaller quantities of copper had a slightly deeper color than those containing more copper. Further experiments were made with milks containing still smaller quantities of copper, with the results shown in Table II.

TABLE II.

	Parts of Copper (Cu)			
5 cc. Milk.	1 to 560,00	1 to 500,000	1 to 400,000	1 to 200,000
1.5 cc. KI solution added	no color	no color	no color	no color
4 cc. HCl added	no color	no color	no color	no color
Heated to 85° C. for 10 min. ...	faint yellow	light yellow	light yellow	light yellow
Cooled and starch added	reddish brown	light blue	light purple	dark blue

From these results it would seem that a copper content of 1 part per 500,000 parts of milk might be accepted as the limit of sensitiveness for copper when applying the Rupp test. However, further experiments led to the conclusion that 1 part per 425,000 is a better limit upon which to base a positive reaction. In these experiments fresh milk was used and no consideration was given to the minute traces of copper that milk normally contains.

The tests show conclusively that copper interferes with the Rupp test. They show also that the sensitiveness of the test is very much greater for copper than for chlorine. Rupp found that the test would show the presence of 1 part of chlorine in 50,000 parts of milk; the experiments here described indicate that the test will show with certainty 1 part of copper in 425,000 parts of milk. The sensitiveness of the Rupp test is, therefore, at least eight times as great for copper as for chlorine.

Alhough it seemed unnecessary to try the method on milks containing added chlorine, for the sake of completeness tests were made on milk to which chlorine antiseptics had been added. Results are shown in Table III.

TABLE III.

	Parts of Chlorine (Cl)			
5 cc. Milk.	1 to 7,750	1 to 10,000	1 to 15,500	1 to 20,000
1.5 cc. KI solution added	no color	no color	no color	no color
4 cc. HCl added	cream yellow	pale yellow	distinct yellow	no change
Heated to 85° C. for 10 min. ...	color slightly less	distinct yellow	pale yellow	no change
Cooled and starch added	light blue	light blue	brownish purple	light blue

From this investigation it is evident that the Rupp test is not reliable for the detection of added chlorine in milk when the milk contains more than 1 part of copper in 400,000 parts. As has been shown, fresh milk contains very much less copper than 1 part per 400,000. It may, therefore, be assumed that the Rupp procedure is admissible for testing a fresh milk for chlorine. In fact, in all the tests made on fresh milks, including bottled market milks, the Rupp test gave negative results. Nevertheless, it is conceivable that under certain conditions bottled milk might take up enough copper to give a positive reaction with the Rupp test. It would seem, therefore, that in case a milk gives the Rupp test, the copper content of the milk should be established in order to avoid an erroneous conclusion as to the presence of added chlorine.

REFERENCES.

1. The Use of Chlorinated Lime in the Sterilization of Milk Utensils. *Eighth Annual Report Int. Assoc. Dairy and Milk Inspectors*, p. 193, 1919.
2. *J. Agri. Res.*, Vol. 26, No. 8, 1923, p. 375.
3. *J. Am. Pharm. A.*, Vol. 12, No. 7, 1923, p. 592.
4. The Detection of Hypochlorites and Chloramins in Milk and Cream. U. S. Dept. Agr., *Bull. No. 1114*, 1922.
5. The Rate of Decomposition of Sodium Hypochlorite in Cow's Milk. *J. Dairy Sci.*, Vol. 6, 4:310, 1923.
6. Standard Methods of Chemical Analysis, 3d ed., p. 197, 1922.
7. The Copper Content of Cow's Milk. *J. Dairy Sci.*, Vol. 5, 5:455, 1922.

MEDICAL AND PHARMACEUTICAL NOTES

SEX SHOWN BY CHEMICAL TEST.—A chemical test for sex, so delicate that with a few drops of blood or of extract of plant juices, it will show whether the animal or plant was male or female, is being used at the Department of Genetics of the Carnegie Institution of Washington. The two scientists who are using it, Miss Sophia Satina and M. Demerc, state that it was originally worked out in Russia by Drs. E. O. Manoilov and O. Gruenberg, but that it has only recently become known outside of that country.

When applied to dilute solutions of animal blood, a few drops of the reagents cause the blood of male animals to lose its color, while under the same treatment the blood of female animals remains reddish-violet.

The original discoverer, Dr. Manoilov, believed that the reaction depended on differences between the hemoglobin, or red coloring matter, in the blood of male and female animals. In order to see whether this theory also applied to the green coloring matter in plants, which is chemically similar to hemoglobin, the experimenters here tried it on plant solutions. They found that the green coloring-matter apparently has nothing to do with the reaction, though the plant extracts responded to the tests as definitely as did animal blood.

Whatever the unknown basis of sex may be, it is apparently the same throughout the whole range of the plant and animal kingdoms, for the test has been applied with success to the determination of sex in such diverse forms of life as mice, sheep, pigeons, fruit-flies, seaweed, willows, poplars, hemp, begonia, and a number of other plants.

—*Science Service.*

SULPHUR AND INSULIN.—Years ago sulphur was extensively used by the laity in the treatment of "sugar sickness," empirically, of course. That was the way with most remedies. Insulin is now the master remedy in the treatment of that dreaded disease. Strangely enough it is now found that insulin may be a compound of sulphur. This conclusion is indicated by research work done by Dr. John J. Abel and E. M. K. Geiling at the California Institute of Technology, as reported in the *Journal of Pharmacology and Experimental Thera-*

peutics. Although a preparation of insulin from the pancreas gland of cattle has been in common use for three years, no chemist has yet succeeded in purifying and analyzing this unstable substance.

In investigating the chemical and other properties of insulin, the authors were able to purify the commercial product until its potency was increased from three to five times. When this purified and concentrated insulin was treated with sodium carbonate, sulphur separated from the extract and the insulin lost its potency. This indicates that insulin is dependent upon the presence of sulphur in its make-up for its power to remedy the effects of diabetes.

As a result of this discovery the question arises whether or not the pancreas, which produces insulin, may be dependent upon a sufficient supply of sulphur in food for its ability to produce this hormone.

RECENT DISCOVERIES IN CANCER.—Information given to the public by cable from England to the effect that the cause of cancer has been found in an ultramicroscopic germ should lead no one to suppose that the methods of dealing with this disease hitherto developed by the scientific world are about to be superseded.

What has been discovered in England is apparently the causative agent of a particular kind of tumor in certain animals. This is a long way from furnishing ground for the opinion that cancer in human beings is due to the same or a similar parasite, or, in fact, to any microörganism whatever. Still more remote is the possibility that the discovery will lead to the preparation of a specific cure for the disease called cancer.

The best security which is afforded today against cancer lies in the earliest possible recognition of the disease and the prompt employment of skillful surgeons and radiologists.—GEORGE A. SOPER, Ph.D., *Managing Director, American Society for the Control of Cancer.*

DOCTORS AND DOCTORING UNDER THE PHARAOHS.—The recent discovery of the tomb of Tutankhamen has aroused widespread interest. He was the twelfth king of the eighteenth dynasty and reigned about thirty centuries ago. His reign was brief, but he is represented as a powerful monarch, maintaining peace in his dominions and wars of conquest in other lands. Material for determining the condition

of medical science in those remote days is at hand, in the form of papyrus manuscripts as well as allusions by Greek writers, notably Herodotus. The most ancient papyrus now available is from about the nineteenth dynasty, therefore later than Tutankhamen. The best-known manuscript is the "papyrus Ebers." It was found in 1873 in the neighborhood of Thebes, and is now in the library of the University of Leipzig. Its date is fixed at about 1550 B. C. It is twenty meters (about sixty-five feet) long, thirty centimeters wide (twelve inches) and in 108 leaves. Another manuscript is at Berlin. It is much smaller than the Ebers manuscript. As far as can be judged from Dr. Brughs' translation it relates principally to treatment of varicose veins, ulcers and the so-called "sacred disease" (*morbus sacer*) of the Romans, which was epilepsy. It also treats of obstetric practice. Pharmaceutical matters are given much attention, pomades, potions, cataplasms and enemata being described, the materials used derived from all the kingdoms of nature. More than fifty plants are mentioned, ranging from herbs to wood of trees. Among the mineral substances are sodium chloride, copper sulphate and sodium acid carbonate. Blood of several animals, horn of the deer, fat of the crocodile, lion and hippopotamus are included.

The doctors, although not in the priesthood, were members of a special group essentially sacerdotal, and held in high esteem as a rule. The profession was under the protection of the god Thoth, and studies were pursued in some of the temples, as at On (Heliopolis), Memphis and Thebes. Heliopolis, by the way, was the temple, whose priest's daughter became Joseph's wife. Herodotus, speaking of physicians in Egypt, says that they were very numerous, and that many of them specialize, some in diseases of the eye, others in visceral troubles. Eye and skin diseases were probably very common, due to infections. They were treated with local applications of mineral germicides, such as copper and lead salts. In affections of the digestive tract, purgatives, emetics, sudorifics and diuretics were used; in gynecologic practise, leucorrhœas, prolapsus, dysmenorrhœa and amenorrhœa are mentioned. As might be expected, obstetric practice proper was left to the midwife, except when abnormal conditions arose. Prescriptions for stimulating uterine contractions and promoting lactation were known. The new-born was the object of much care, breast feeding being the almost invariable rule, but mention is made of the use of cows' milk and cereals. Infants were kept naked until about five years old, and even at ten had but little attire. Juve-

nile education was associated with athletic sports, from it would seem that the doctors of that time were alive to the importance of a rational hygiene. From an article by DR. A. GUISAN, in *Journal Suisse d. Pharmacie*, 1925, *63*, 476. H. L.

A DIETETIC SUGGESTION.—A newspaper report of proceedings at a recent meeting of those interested in dairy farming stated that one source of waste is the lack of demand for skimmed milk. The most valuable and most sought constituent of whole milk is the butter-fat, the extraction of which is now almost complete under modern centrifugal methods, leaving a material lacking in one of the most nutritious ingredients. Some extravagant statements have been reported as uttered by Mr. Henry Ford, to the effect that "synthetic milk" will be a commercial product before long and will eliminate "Sukey" and all her tribe. Just what this kind of milk is to be, how it is to be produced and at what price is not yet made known. There has, indeed, been in the last decade or so, a considerable amount of foolish talk about synthetic foods. Even some distinguished chemists have been led to make assertions that before long a complete meal can be carried in the compass of an ordinary capsule. This extravagance has been partly caused by the success which has attended the researches into the structure of the carbohydrates and proteins, enabling the production of synthetic sugars and protein-like substances. The general structure of the fats and oils was elucidated by Chevreul early in the nineteenth century, but the other two classes of foodstuffs remained obscure until quite recently. Food, however, is not a mere matter of a few definite materials. Physical conditions and accessory ingredients are essential. In discussing this subject one is reminded of the story of the little girl, who having been ill for some time and fed on several kinds substitute foods, finally sat up in bed and said, "Not another ounce of nourishment will I take. I want my dinner."

The statement that synthetic foods of the type above noted are not of value does not negative the suggestion that foods defective in some important ingredient may be associated so that the deficiencies may be mutually corrected. The thought has occurred that such a method might be applied to enriching skimmed milk. Butter-fat will be always in active demand and skimmed milk is apt to be in over supply. How will it do to incorporate into this a few per cent. of

cod-liver oil, by some simple emulsifying agent? This oil has a high vitamin content, and emulsions containing large proportions of it are familiar. The proportion required for producing "filled milk," as it might be called, would be only about 4 per cent., a quantity that would impart but little of its characteristic taste. A foodstuff would then be obtained which would have the essential characters of whole milk. It would, it is true, be a little more like a medicine than a food, but would surely be superior to the common emulsions which contain nothing nutritious other than the oil itself. A certain grade of cheese might also be obtained. In discussing the statement of Mr. Ford, some of the experts of the Bureau of Chemistry have inquired what would be done for cheese, but the above suggestion seems to be worthy of consideration. It must also be borne in mind that enabling skimmed milk to have a steady and active market will be an aid to the dairy industry, a matter of no little moment.

Of course, strict supervision would be needed to prevent the sale of this for whole milk, but the distinction between butter-fat and the oil is easily made, and no difficulty would arise in such control. H. L.

SYNTHETIC ETHANOL.—Reference was made in this JOURNAL lately to the French and German procedures for the production of methanol by synthesis, and the possible economic and sanitary problems that may arise therefrom. It is somewhat interesting to note that French industrial science has developed a process for making ethanol from ethylene. The establishment is at a mining plant at Bethune, where by-product coke-ovens are operated on a large scale, and also Claude's methods for synthesis of ammonia. The ethylene exists in small amount in the coke-oven gas. It is concentrated by refrigerating methods until a rather high percentage is obtained, then treated with sulphuric acid, by which ethyl hydrogen sulphate (sulphovinic acid) is produced, which is saponified by the action of water and ammonia, yielding ammonium sulphate and ethyl hydroxide. It is stated that one cubic meter (35.3 cubic feet) requires about 6.75 pounds of sulphuric acid and yields about 4.5 pounds of alcohol. It is not stated what the concentration of the product is, but it is probably of high content in real ethanol.

The most powerful impulse towards the development of such processes in France, as well as in some other great nations, is the desire to secure abundant supplies of motor fuel within the terri-

tories of the respective countries. The dominance of the combustion motor in peace and war is impressed on all statesmen, and each nation realizes that while, when peace prevails, the securing of supplies of all kinds is a simple matter, war with its blockade features gives a far different aspect. The data for the present note are from a French journal of engineering chemistry, *Chimie et Industrie* (1925, *13*, 718). In the same issue is the conclusion of a long article by another chemical engineer on the different methods that may be available for obtaining sufficient motor fuels on French territory.

H. L.

NEWS ITEMS AND PERSONAL NOTES

OBITUARY.

CHARLES LEEDOM,—Druggist at Twentieth and Cherry Streets, Philadelphia, Pa., a former president of the Philadelphia Association of Retail Druggists, and a member of the Board of Trustees of the Philadelphia College of Pharmacy, died at his home recently, following several months' suffering from heart trouble. He was born at Newtown, Pa., and was a graduate of class of 1881 of the Philadelphia College of Pharmacy. After serving as manager of the Broad Street Station Pharmacy for a time, he purchased the drug store at No. 1403 Filbert Street, which he conducted for many years. He was later a partner in the firm of Leedom & Wissler, druggists at Chelten and Pulaski Avenues, until recently. For many years he supplied the Pennsylvania Railroad with the medical supplies used in its offices between Philadelphia and Pittsburgh. He was a member of the Masonic Order and of the Pennsylvania and American Pharmaceutical Associations. He is survived by two brothers and two sisters.

H. T. EBERLE,—Pharmacist at Watertown, Wis., for nearly fifty years, died at his home in Evansville, Ind., September 1st. Mr. Eberle received his early education in the public and private schools of Watertown, and later attended Northwestern College. Thereafter he was an apprentice in a drug store of his home city, and in 1871 matriculated at the Philadelphia College of Pharmacy, serving during

vacation and other periods in the pharmacy of E. B. Garrigues & Co., at Tenth Street and Fairmount Avenue. He graduated in the class of 1873, among the living members of which are—Samuel W. Fairchild, of New York, Dr. Richard V. Mattison, of Ambler, and Prof. J. H. Flint, of San Francisco.

After graduation Mr. Eberle returned to Watertown where he and his father had purchased the drug store of Dr. Edward Johnson, a pioneer physician and pharmacist of Wisconsin, and the firm name changed to that of G. and H. T. Eberle; some years thereafter the Shubert pharmacy was purchased and the two stores consolidated. The father retired from the drug business, which was continued by H. T. Eberle as sole proprietor until a few years ago, when, on account of impaired health, he sold the store and moved to Evansville, Ind. Mr. Eberle was postmaster at Watertown during the terms of the late President Roosevelt.

The deceased is survived by his widow, Mrs. Ida L. Eberle; one daughter, Mrs. Richard Rosencranz, of Evansville; two sons, Ralph Eberle, of Milwaukee, Wis., and Sidney F. Eberle, assistant postmaster at Watertown, Wis.—a son, Roger, died several years ago; two sisters, Mrs. Charles DeMairis and Mrs. James Beach, of Fond du Lac, Wis., and a brother, Dr. E. G. Eberle, of Philadelphia, Editor of the *A. Ph. A. Journal.*

Mr. Eberle was very much interested in municipal affairs; he was one of the organizers of the public library at Watertown. For many years he was a vestryman of the Episcopal church of his home city. He was laid to rest in Oakland Cemetery, on the slope of a hill which faces beautiful Rock River.

The deceased was a member of the American Pharmaceutical Association, and one of the organizers of Wisconsin State Pharmaceutical Association.

Personal Notes From Switzerland.—In the issue of the *Schweizerische Apotheker Zeitung* for August 8, (1925, *63*, 453), a greeting is extended to the hundred or so American pharmacists who are expected in Switzerland in connection with a tour of Germany and Austria. The ancient republic expresses its respect and friendship for the younger, hoping that the starry banner and the Swiss cross may always wave in harmony.

The Fifth Assembly of the International Pharmaceutic Federation was held at Lausanne, July 21-22d. Among the registered

delegates was Professor Arno Viehoever, of Philadelphia. Professor E. Fullerton Cook was admitted as an associate member of assembly and the American Pharmaceutical Association was made one of the constituent organizations.

"Open Window" Campaign.—Prizes aggregating $85 are offered by the National Tuberculosis Association, 370 Seventh Avenue, New York City, for the best window displays boosting its nation-wide "Open Window" campaign to be held in October or early November. The dates will differ in various sections of the country to conform to local conditions.

The first prize will be $50, the second $25 and the third $10. In addition to these prizes, $3 will be paid for all entries available for use in future publicity matter. Entry is to be made by sending the association a photograph and written description. Prints should be glossy; size eight by ten inches are preferred.

Photographs must reach the association on or before December 1, 1925. The judges will be Ernest A. Dench, Chairman, well-known writer on window displays, Ned Mitchell, Superintendent of Displays, Louis K. Liggett Co., and Philip P. Jacobs, Publicity Director, National Tuberculosis Association.

Factors that will govern the choice of prize winners will include: effectiveness of health message showing value of open windows; merit of the tie-up with the dealer's merchandise, and originality of the display idea utilized.

The campaign will be fostered by the affiliated tuberculosis organizations in each state, who will disseminate the plans, posters and literature to more than 1500 local associations.

Two posters are available, one in three colors, entitled "Health Blows Through Open Windows" and an impressionistic study in two colors, "Open Windows Bring Good Health." Neither of these posters contains any additional advertising matter than the slogans stated.

Further information is available through the headquarters of the National Association at the address given above.

BOOK REVIEWS

CYCLOPEDIA OF PERFUMERY. E. J. Parry. Two volumes. 840 pages. P. Blakiston's Son & Company, Philadelphia. $10.00.

The persistently broadening field of perfumery has not been without its concomitantly expanding literature, yet there has been a great want for a book such as this cyclopedia of raw materials. The work of compiling these two volumes has been a tremendous task and on the whole it is a task well handled. One of the substantial tests for a compilation such as this is to turn over the pages of a related work, in this case, let us say, a perfumery price list or journal, and singling out certain unfamiliar terms, then seek to find their meanings. Such a venture proved quite complimentary to the comprehensiveness and completeness of this work.

As might be expected of such a scientific book of reference, formulas for finished perfumes are not given.

On several occasions the definitions met were not completely satisfying, particularly in view of the fact that an element of doubt appeared in the text. The words, *probably* and *perhaps* serve well in the lexicon of the weather forecaster but they should have no place in a scientific cyclopedia.

It would, however, have been impossible for a monumental undertaking such as this book represents, to find its way into print free from any imperfections.

In the opinion of this reviewer it is a most conveniently arranged book, well printed and bound, and standing in a class by itself in the field of purveying scientific information in the field of perfume agents.

I. G.

SCHLAFMITTEL-THERAPIE. Von Dr. Albrecht Renner. Lex. 125 pp. Verlag von Julius Springer, Berlin W. 9.

Just off the press, is published by the well-known German firm a monograph on "Therapy of Hypnotics," by Dr. Albrecht Renner, physician at the City Hospital in Altona.

Since the introduction of chloral hydrate by Liebreich in 1869 as the first hypnotic of the alcohol group, the market has been flooded by better and frequently worse hypnotics. The author very cleverly divided these, according to their action, into five groups:

1. Bromural, Adalin, etc.

2. Paraldehyde, Amylenehydrate, Urethane, etc.
3. Neuronal, Dormiol, Isopral, Dial, Proponal, etc.
4. Chloral Hydrate, Chloramide, Sulphonal, Trional, Veronal, Luminal, etc.
5. Somnacetin, Codeonal, Dialacetin, etc.

The action of each group and the different hypnotics belonging thereto is thoroughly discussed and a complete bibliography comprising 856 references is a sure proof of this proverbial German thoroughness. I must not forget to mention the highly interesting and instructive chapters on "Untoward Effects and Their Prevention and the Crave for Hypnotics."

We can highly recommend this monograph to physicians, pharmacists and chemists.

OTTO RAUBENHEIMER, Ph. M.

GASOLINE. WHAT EVERYONE SHOULD KNOW ABOUT IT. By T. A. Boyd, Head of the Fuel Section, General Motors Research Corporation. Fully illustrated. Octavo, 211 pp. Cloth, $2.50. Frederick A. Stokes Company, 443-449 Fourth Avenue, New York City.

The average man and even the motorist does not know as much about gasoline as he does about rubber tires or automobiles. The author in this book before us tells the fascinating story of gasoline, simply and clearly from the oil well to its final utilization in the engine.

Among the nine chapters I want to call special attention to the following: II. Petroleum, the Source of our Automobile Fuel; III. How Gasoline is Separated from Petroleum; IV. Cracked Gasoline; VI. The Volatility of Gasoline; VIII. The Dangers in Gasoline and How to Avoid Them.

The highly interesting "Story of the First Oil Well" of Colonel Drake occupies pp. 28 to 32 and should be read by all interested, thus laying the foundation for one of America's greatest industries. The statement on p. 26 that Peter Kalm was a *Russian* traveler and naturalist should, of course, be corrected to *Swedish!*

To read this book is a treat. Pharmacists will do well to become acquainted with the story of Gasoline. The publishers are to be thanked for getting out this book, a valuable addition to their other popular publications!

OTTO RAUBENHEIMER, Ph. M.